The Iron Age

A Review of the Hardware and Metal Trades.

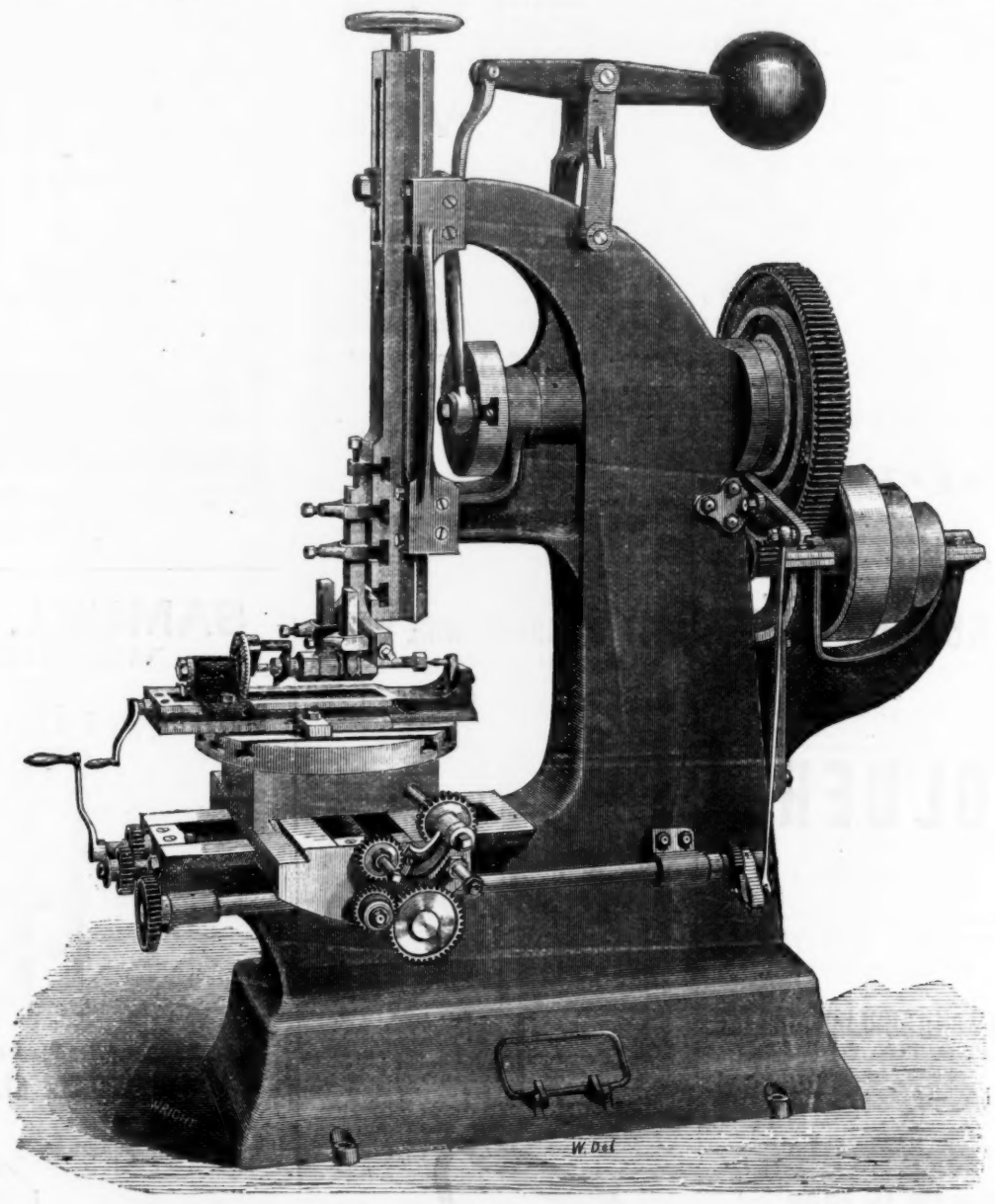
Published every Thursday Morning by DAVID WILLIAMS, No. 10 Warren Street, New York.

Vol. XIII: No. 10. *New York, Thursday, March 5, 1874.* *Four Dollars a Year. Single Copies, Ten Cents.*

Improved Slotting Machine.

We present herewith an illustration of an improved slotting machine, lately introduced to the trade by the New York Steam Engine Company, No. 98 Chambers street. This machine has an extreme stroke of 8¼ inches, and will slot to the center of 36 inches. The crank shaft, 3¼ inches diameter, is driven by a differential crank motion, giving a quick return to the bar, which has a continuous guide, and is perfectly balanced by lever and weight. The crank motion is driven by gearing seven and a quarter to one, the pinion shaft having a cone of three changes, driven by a 3 inch belt, largest end of cone 14 inches. The table has feed in three directions, viz: longitudinally, transverse and circular, and has a traverse of 16 inches longitudinally, and 16½ transversely. The circular table is 20 inches diameter. All of the feeds are driven from one feed shaft in a simple and effectual manner. The bar has a vertical adjustment of 10 inches. The machine is provided with patent hollow self-oiling counter shaft, that will run after once being oiled, twelve months, and is in every respect complete.

The same company are also introducing Chapman's patent slotting and planing tool, which meets favorable mention. This tool consists of a steel yoke bar which can be attached to the main slotting bar of any slotting machine. At each end of this yoke bar is a screw passing through the poppits, or tool holders, and by these screws the cutting faces of tools can be placed at any required distance. The piece to be planed is placed in indexed centers, and by this means square bars, hexagon bars and nuts, octagon bars, or pieces, and, in fact, any piece with two parallel sides can be planed or paired with these tools. In attaching to a planer, the yoke must be fastened to clapper or tool box.



IMPROVED SLOTTING MACHINE.

Notes on Iron.*

By THOMAS MORRIS, Manager of Dallam Forge, Warrington.

What is this material called iron—this most useful of all metals—the intrinsic value of which exceeds all others, and which, in proportion to its use, should be the cause of progress of civilization in the world wherever it is manufactured—a substance whose extent of consumption by any nation, both in times gone by and at the present day, indicates very truly the degree of its advance in the arts and sciences? If we ask the geologist, he tells us that it impregnated the waters of the old red sandstone period, and tinged with rusty red the whole of that system; that it now appears in the segregated form of thin layers and bands of ironstone; that its ores are found more or less in all parts of the world, either as beds in the sedimentary rocks, or in the massive deposits in the olden rocks; that the United Kingdom derives its principal supply from the earthy carbonates of the coal measures, from the carboniferous formations where some particular coal fields possess large deposits of rich hæmatite ore—instance the Cumberland Lancashire district; from the oolitic beds of Cleveland and of South Yorkshire, where it is found from a few inches to 20 and 30 ft. think; and those extraordinary carbonaceous blackband ores of Scotland, where the richest deposits hitherto discovered are found. The meteorologist tells us the sun and the atmosphere played a most important part during the carboniferous era, and that now we are consuming the bottled-up sunlight of millions of years past in the making of iron. Again, iron in the shape of falling meteors has been found, and from one of these bodies a Persian Emperor had made two sabres, one knife, and one dagger. This "iron of lightning," or thunderbolt, could not be worked up by itself, but must have been mixed with one-fourth of common iron before the Tubal Cain of that day did his master's bidding. It would be a wrinkle worth knowing how he obtained the mixture. The mineralogist has been consulted, and he simply says that he has given us the various degrees of hardness of minerals, determined the idea of the species, and fixed the principle of classification. Coming to our nearer friend, the metallurgist, he lets us know the numerous combinations and analyses of the particular metal we wish to study; what mechanical and chemical sciences are involved to complete the separation of the metal in that condition of purity desired by the manufacturer; what flux will best suit to form a glass with the multifarious ores during their fusion in that huge laboratory, the smelting-furnace. He tells us that without flux to separate the earthy matter from the ores, glasses would be formed, instead of the carburet of iron, and slags, and that the best known flux for nine-tenths of the ores is limestone, which is incapable of holding iron in solution at high temperatures; that there must be blown under pressure from 6 to 10 tons of atmospheric air in the furnace to produce the required oxygen for the reduction of 1 ton of pig iron from the ore. Beside this, he can, if he will, tell us his utter inability to produce the same quality, or the same quantity of iron during the smelting process from two different ores. Yes, all his skill in the science of chemistry, his numerous experiments and analyses, have signally failed to furnish him with this grand object. Undoubtedly his assiduity in the science of chemistry has taught him judiciously to mix the ores given him by nature, and thereby to produce a suitable article for his customer; but inasmuch as the ores differ in their component parts, as the coal or fuel differs in its constituents, whether he uses hot or cold blast, so does he give us a cast metal commercially called pig iron, at the price it will fetch in the market. And it is from this market that the finished iron manufacturers (as in Warrington) take it in hand, and by two distinct processes convert it into bars, plates, wire, etc.

We have arrived now at the puddling process, which is replete with interest, consisting as it does of converting cast metal into malleable iron. The present system of puddling as carried on almost universally with few modifications (which shall be named), was invented by an ironmaster of the name of Cort, about the year 1780, the bed of whose furnaces was made of sand. When the carburet of iron was refined, many of its impurities (especially the carbon, which is the metalloid causing fluidity) were driven from it; hence when the pig iron was melted, it assumed the form of grain. If the carbon had been left in the pig metal, the bed of the furnace could not have stood; beside, silica is fatal to iron, causing what is technically known as shortness or extreme brittleness. The deteriorating influence which sand or silica had on the iron when worked in contact with it was seen some years afterward by Mr. Samuel Baldwin Rogers, who introduced the present system of iron bottoms to furnaces, which eventually did away with the finery process. Both of these gentlemen died in poverty, yet their inventions in their day were as much a desideratum, and were the cause of greater revolutions in the iron trade of that time than the Bessemer process or Danks' rotary puddler in our time. Mr. Joseph Hall, of Tipton, introduced the present pig boiling process, doing away with the refining process. Many imagine that the gentleman with the cloven foot invented puddling, and I confess that for four or five months in the year it is one of the most distressing processes to the physical system of all manual labor, yet puddlers don't all stagger from the furnace fainting at the age of forty, as a certain special newspaper commissioner would have us believe. These joint inventions were the means of this kingdom taking the lead of all other nations in the iron trade, for up to this time we were dependent for our supplies upon Norway, Russia and Sweden; from the latter place, even now, a large amount of their produce finds its way into England.

In describing this puddling process, it should be explained that the furnace is divided into two compartments, separated by a bridge about 12 in. thick and 14 in. high. Over this the flame passes from the grate and comes in contact with the iron, and after it has done duty there passes around the boilers, generating the steam necessary for driving the machinery required for forging and rolling the iron. The chamber or compartment into which the pig metal is charged consists of iron plates, forming the bottom and sides, which are lined with refractory slags, rich in oxides of iron. In changing the heat, slags and scales from the hammers and rollers are thrown on the hearth or bottom, and on this the charge of pig metal, consisting of 510 lbs. to 540 lbs. Fuel is then thrown in the grate, and in about 25 or 40 min. this carburet of iron becomes liquid, and assumes the form of a molten plate of iron some 1½ to 2 in. thick. Being heavier than the slags, the latter pass through it and rise to the top. In passing, the oxygen of the silicates combines with the carbon of the iron and decarbonizes it, but unless the iron is agitated it would not become malleable. Hence the puddler, with a bar called a rabble, agitates the metal, thus bringing the oxygen of the silicate in contact with the carbon and other impurities of the iron. As the carbon is leaving the metal its atoms expand and become of less specific gravity, and it throws off carbonic oxide gas, the blue flame of which is plainly seen by any one who watches the process. The puddler at this stage must be incessant in his operation, for the transformation scene is coming, and the crude iron is becoming malleable. The boiling of the mass is kept up by the fresh energy of the puddler, until, as the carbon diminishes, the atoms of the iron begin to knit or agglutinate together in a soft, spongy consistency, the cinder taking the place of the once molten iron. The iron is now as sensitive to oxygen as the human lungs would be if inhaling pure oxygen; it lives, as it were, too fast. It is at this point the smoke-preventers are puzzled, but a deoxidizing flame is kept on the iron while it is being kneaded and divided into balls preparatory to being brought out of the furnace; which, when done, the lump is taken to the hammer and beaten into the required shape for rolling it into the puddled bar of commerce. This operation is called shingling.

From what has been said you will readily understand that the puddling operation consists of chemical combinations and mechanical application; and the inventions brought forward to assist the puddler in his part of the business are legion. The schemes tried to prevent smoke, save fuel, etc., etc., may be counted by scores. Quacks by the dozen have sprung up, with physic to throw in the molten iron during the process, to drive off the deleterious substances, the one idea being that the iron would have a greater affinity for their dose than it had for the metalloids, carbon, phosphorus and silicon, and so leave the iron pure. None of these recipes, however, have been so effectual as to warrant their continued and general use. Mr. Bessemer, some 25 or 30 years ago, accomplished the grand idea of forcing air through a molten mass, anticipating that the oxygen of the air would decarbonize the carburet and give him malleable iron; but he failed, for when the iron had given up its last equivalent of carbon to the oxygen it commenced to burn it up. Besides, it lacked the kneading, or mechanical part of the operation. The chemical part he got over so far as to produce a metal thoroughly tenacious; and its resistance to wear proves it to be the most durable and economical material for railway and other purposes. This invention of Bessemer's awakened metallurgists, and gave rise to several inventions for steel making, but up to the present time there is only one invention of any practical importance, and that is the Siemens-Martin process.

About the same time as Bessemer was completing his inventions two gentlemen, Mr. Tooth, of London, and Mr. Walker, of Wolverhampton, brought out patents for oscillating and rotating puddling furnaces, which proved a step in the right direction. Somehow they got across, and their scheme was going when Mr. Menelaus, of Dowlais, bought up their rights, built a forge, and made some good iron. But he found several obstacles in his way, the principal one being the lining of the furnace, which he could not get to stand the severe wear and tear of the metal, and on this rock he came to grief. But this rotary principle had made its impression upon the minds of many people in this country and in America, and more especially upon Mr. Danks. This gentleman was born in West Bromwich, South Stafford-shire. He was a puddler by trade, but left that part of the country at the age of twenty for Scotland. After working there three or four years he went to America, and was eventually engaged in the Cincinnati Railway Ironworks Company as their superintendent. In 1868 this representative of English thought and skill, assisted by American cash and enterprise, built the first experimental rotary furnace, differing from that of Mr. Menelaus only in the flue of the furnace being movable. So significant was this improvement that it led to success, and the patent is now being worked in many parts of England and on the Continent. Complete puddler as is this furnace, it has the fault of producing only one ball, whatever the charge may be. And to produce balls of 100 lbs. or 200 lbs. weight only by this machine would increase the cost of its production. The rolling machinery employed at the present day is only calculated to forge and roll this weight of ball; hence the iron manufacturer, whose production consists of small bars, sheets, and hoops, cannot apply it.

Before leaving the puddling operation I should mention another very interesting principle of making iron which is undergoing a crucial test as to its commercial practicability, and that is a plan worked by Messrs. Gerhard and Caddick, of Bradley, South Stafford, who say that the bloom is made direct from the ore (mark, no smelting, and 50 to 60 per cent. of coal saved), which, having been ground, is mixed with lime and pitch, and then baked in a coke oven. This becomes the pig iron. A furnace is charged with it, and in half an hour the charge is ready for the hammer. Elba and Barrow iron is at present being used, and excellent finished iron is being turned out.

We have now got to the puddled ball, in which, although it has been kneaded, the particles are in a very loose state, and require the repeated blows of the heavy forge or steam hammer to knock out the slag which still attaches itself. Truran says the puddled ball is like grains separated by a thin film of extraneous matter (cinder), and when shingled the grains are brought closer together. When rolled into a bar 12 ft. long, each particle is about 9 in. long. Cut this bar into lengths, pile and roll, and we find in one inch of its section as many threads, or fibres, as were seen in 80 in. of the ball. Truran would have us assume that all iron is fibrous in the puddled bar, and, consequently, that it must be fibrous in the finished bar. This is a mistake, for often enough the puddled bar is crystallized, and no matter how many times this class of iron is worked over again, fibres cannot be developed. I have mentioned the fibrous bar, which is tough and ductile, hot or cold, and the cold short, or crystallized bar. But there is the "hot short" quality; and this class of iron is as much to be guarded against as the cold short, for while the engineer who is constructing a bridge or building a vessel dreads the cold short iron, so does the blacksmith and the boiler maker dread the hot short. The iron manufacturer is the greatest sufferer from this class of iron, for, after the iron has passed all its processes, its characteristics are seen in the finished iron in the shape of small cracks, at times so minute that an experienced eye only can detect them, and when found, the bar must be thrown to the scrap heap. Indirectly, too, the iron master comes in for blame and cost, for if this defect is not detected before leaving the works, and the consumer does not find it working hot to the shape he requires, he immediately demands compensation from the manufacturer, or returns the iron upon his hands. In Wales, at one time (it is somewhat improved now), iron was so short when red, that the rough or puddled bar would drop in pieces while rolling at the forge rolls. The method of working up these short bits into finished iron, principally rails, was to make a large pile, and, having a full sized bottom to start from, it was built up to the required weight. In this manner the commonest of iron made from the lowest of ores, containing a large amount of iron pyrites, was worked up and made suitable for rails. Makers of high class iron are very careful to avoid this. Red short iron is that which cracks when bent or punched at a red heat, although it may be sufficiently tenacious when cold. Cold short iron, on the contrary, is weak and brittle when cold, but can be worked without difficulty when hot.

The puddled bar is now before us, and must go through process No. 2 before it is fit for commercial uses. Hence, it is cut down into suitable lengths, taken to the finishing mill, when it is piled up to the weight wanted, and charged in furnaces on bottoms made with sand. When at a welding heat, it is brought out and taken to the rollers again, and reduced to every imaginable shape and section desired by the customers.

(To be continued.)

*Read at the Warrington Literary and Philosophical Society.

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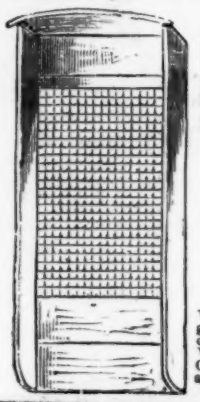

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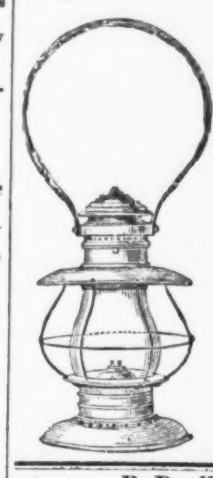

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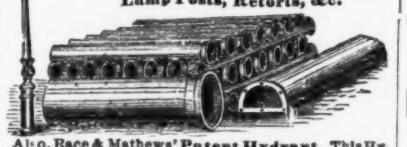

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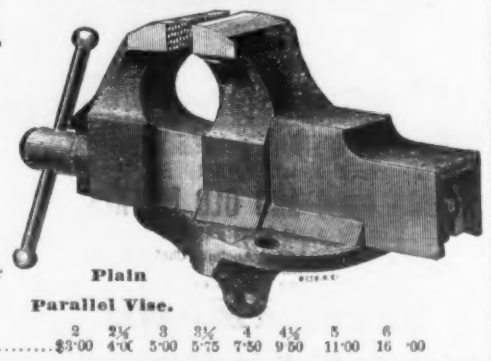

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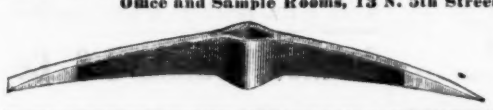

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The Factor of Safety in Engineering Structures.

BY RICHARD H. BUEL.

Comparatively few engineers have the time or means to conduct thorough experiments on the strength of the materials which they are called upon to use, and in designing work they are generally obliged to accept the results of previous experiments. Fortunately, however, the ultimate strength of most of the materials in common use has been quite accurately determined, for the various strains to which they are subjected—and the engineer has only to decide how much of this ultimate strength he will use for a working load, or what factor of safety he will employ, the factor of safety being the quotient arising from dividing the ultimate strength by the working load.

In choosing this factor, there are several things to be considered—not only the kind of strains, whether tensile, compressive, transverse, torsional, or shearing, that will act upon the material—but also how these strains are to be applied, whether gradually, or all at once, after the manner of a blow. Other matters affecting the choice of a factor of safety will be mentioned further on. It is easy to see that the effect of a quiescent load upon a structure will be quite different from that of the same load suddenly applied. Suppose, for instance, that a force P is gradually applied to a bar, increasing its length by an amount 8. The force commences to act with an intensity of nothing, increasing by slight degrees to P, so that the mean pressure exerted during the elongation is P÷2, and the work of stretching the bar, called the work of resilience, may be represented by the expression (P×8)÷2. If this same force P is suddenly applied, it will act during the elongation with a mean pressure P, twice as great as the former mean pressure—and if, in the first case, the bar is stretched up to its elastic limit, under the latter conditions a permanent set will be produced, or the bar will be broken. This is an experiment that can be performed by any one, using a spiral spring, and applying a weight to it in the two ways previously mentioned. It would appear from this, that in the case of structures which are to be subjected to the action of impulsive forces, not more than one-half of the ultimate strength can be used for a working load. It seems probable that forces do not generally act in this manner in ordinary structures. In the case of railway bridges and tracks, which are required to sustain a rolling load, both theory and experiment show that the force is more injurious to the material than if it were gradually applied, and that the effect is somewhere between that produced by quiescent and sudden loads, depending upon the speed of the moving train.

Mention has been made of the elastic limit, or the point at which a permanent set occurs, after the material is elongated, compressed, bent, or twisted, and it was formerly supposed that when a set was produced, the value of the material for resisting strains was destroyed. Subsequent experiments have shown, however, that a material may take a set, without having its strength impaired, and the limiting strain is that which does not increase the set, if repeatedly applied. The weight that will produce this limiting strain is called the proof strength of the material—and as this must never be exceeded in practice, it is evident that the engineer is interested in knowing the proof rather than the ultimate strength of the materials which he is to use. Experiments in regard to the ultimate strength of materials have been more extended than those relating to the proof loads, and, hence, the constants for the latter cannot be given with so much precision as for the breaking weight. From such experiments as have been made, however, many valuable conclusions have been derived, and it may be well to devote some little space to their consideration.

In regard to tensile strength, the following table gives average values in a few cases:

TENSILE STRENGTH IN POUNDS PER SQUARE INCH OF CROSS SECTION. (Strain applied gradually).

Material.	Ultimate Strength.	Proof Strength.
Cast Iron	16,500	8,250
Wrought Iron (bar)	45,000	22,500
Wrought Iron (boiler plate)	50,000	25,000
Pittsburgh Steel (plate)	95,000	42,500
Bessemer Steel	99,000	44,500
Black Diamond Steel (bar)	130,700	60,350

These materials, when subjected to the action of sudden strains, give varying results—some of the stronges. materials being broken by a blow which does not injure the weaker ones. This is because the elasticity of a material frequently varies inversely as its strength, so that the stronger grades are not so well able to resist shocks as inferior varieties. The following table, taken from Trautwine's *Engineer's Pocket Book*, to which valuable work the writer is indebted for many of the figures used in this article will illustrate this fact.

ULTIMATE TENSILE STRENGTH IN POUNDS PER SQUARE INCH AND ELONGATION IN INCHES, BEFORE BREAKING.

(NOTE.—The specimens tested were steel bars of different grades, made from pure Swedish iron, and each bar was turned down to a diameter of one inch, for a length of 14 inches).

Specimen.	Per cent. of Carbon.	Breaking Weight.	Elongation in inches.
No. 1	·33	68,100	1·37
No. 2	·43	76,160	1·37
No. 3	·48	84,000	1·25
No. 4	·53	95,200	1·12
No. 5	·58	92,960	0·81
No. 6	·63	100,800	1·00
No. 7	·74	101,920	0·69
No. 8	·84	123,200	1·12
No. 9	1·00	134,400	1·00
No. 10	1·25	154,560	0·62

It appears from the foregoing remarks that the proof strength of metals used for structures, in reference to tensile strains gradually applied, has an average value equal to one-half the breaking weight, this value varying with the quality of the material. As many structures are exposed to strains acting somewhat in the nature of blows, not more than half the proof strength should be used as a working load. This fact is recognized by reputable engineers, who, in designing iron bridges, proportion the parts composed of wrought iron to bear a maximum tensile strain of from ten to twelve thousand pounds per square inch, and many consider that 8000 pounds per square inch should be the extreme limit for the working load, on account of some other facts in regard to the strength of materials, which will be briefly considered.

The constants used by the engineer in his calculations are generally obtained by experiments upon small pieces of the materials. Now, it is well known that increase of strength does not always follow in direct proportion to increase of size. A large wooden beam, for instance, is more liable than a small one to be weakened by knots and other imperfections, and on account of the difficulty of securing equal cooling in making large castings, large cast iron beams are frequently weaker in proportion to their size than small ones. It may be mentioned, in this connection, that Mr. Hodkinson found it necessary to make corrections in his rules for the strength of cast iron pillars, after experimenting upon pillars of larger size.

Structures exposed to the weather are subjected to great variations of temperature, and when metals are cooled, although they resist quiescent loads quite as well as before, they are more easily injured by sudden shocks, such as are caused by rolling loads.

It is commonly recommended in treatises on the strength of materials, that from one-fourth to one-eighth of the ultimate strength of the material should be taken for a working load, but it would seem that the proof strength is really the limit to be considered. This can be illustrated again by a reference to the resistance of materials to transverse strain. The application of a load to a beam causes a deflection, and, if the proof load is exceeded, the material can no longer be regarded as safe. From the results of experiments on the deflection of beams, the following table is compiled:

AVERAGE VALUES OF ULTIMATE AND PROOF STRENGTH IN POUNDS, OF BEAMS ONE INCH SQUARE AND ONE FOOT IN LENGTH BETWEEN SUPPORTS, WHEN SUPPORTED AT BOTH ENDS AND LOADED IN THE MIDDLE, THE LOAD BEING GRADUALLY APPLIED

Material.	Ultimate Strength.	Proof Load.
Cast Iron	2,000	800
Wrought Iron	2,400	1,000
Steel	6,000	5,000
White Pine	450	150
Oak	600	200

These, it must be remembered, are average values, the same variations being observed in different qualities of the same material when suddenly strained, as previously remarked in the case of tensile strength, so that really the proof strength is the only safe figure from which the engineer can deduce the factor of safety. Average values of these factor, so that the load shall equal the proof strength, are given below:

Material.	Factor of Safety. Load gradually applied.	Impulsive Load.
Cast Iron	2·5	5·
Wrought Iron	2·4	4·8
Steel	1·2	2·4
White Pine	3·	6·
Oak	3·	6·

It will be seen that the proof loads vary with the different materials, whence the factors of safety for the working loads will also vary, if they are taken with reference to the ultimate strength of the materials, while, if calculated with respect to the proof loads, they will be the same in every case. This will be rendered clear by the accompanying table, which also contains other matters of interest:

RECTANGULAR BEAMS, LOADED SO THAT THE DEFLECTION SHALL NOT EXCEED ONE-THIRD OF THAT CAUSED BY THE PROOF LOAD.

Material.	Distribution of Load.	Timber.	Cast Iron.	Wrought Iron.	Break'g Weight.	Proof Load.	Deflection under Proof Load.	Deflection under the same Load.	Assumed Safe Deflection.	Load that will produce Safe Deflection.	Factor of Safety. In reference to ultimate Strength.	Factor of Safety. In reference to proof Strength.
Supported at both ends, and loaded in the middle		W	W	W	W	0·417 W	D	d	D	0·138 W	9	3
Supported at both ends, and uniformly loaded		W'	W'	W'	2 W	0·833 W	1·25 D	0·625 d	0·417 D	0·278 W		
Fixed at one end and uniformly loaded		W''	W''	W''	0·5 W	0·208 W	3 D	6 d	D	0·069 W		
Fixed at one end, and loaded at the other		W'''	W'''	W'''	0·25 W	0·104 W	4 D	16 d	0·333 D	0·034 W		
Supported at both ends, and loaded in the middle		W	W	W	W	0·4 W	D	d	D	0·133 W	7·5	3
Supported at both ends, and uniformly loaded		W'	W'	W'	2 W	0·8 W	1·25 D	0·625 d	0·417 D	0·267 W		
Fixed at one end, and uniformly loaded		W''	W''	W''	0·5 W	0·2 W	3 D	6 d	D	0·067 W		
Fixed at one end, and loaded at the other		W'''	W'''	W'''	0·25 W	0·1 W	4 D	16 d	0·333 D	0·033 W		
Supported at both ends, and loaded in the middle		W	W	W	W	0·417 W	D	d	D	0·138 W	7·2	3
Supported at both ends, and uniformly loaded		W'	W'	W'	2 W	0·833 W	1·25 D	0·625 d	0·417 D	0·278 W		
Fixed at one end, and uniformly loaded		W''	W''	W''	0·5 W	0·208 W	3 D	6 d	D	0·069 W		
Fixed at one end, and loaded at the other		W'''	W'''	W'''	0·25 W	0·104 W	4 D	16 d	0·333 D	0·034 W		
Supported at both ends, and loaded in the middle		W	W	W	W	0·417 W	D	d	D	0·138 W	6	3
Supported at both ends, and uniformly loaded		W'	W'	W'	2 W	0·833 W	1·25 D	0·625 d	0·417 D	0·278 W		
Fixed at one end, and uniformly loaded		W''	W''	W''	0·5 W	0·208 W	3 D	6 d	D	0·069 W		
Fixed at one end, and loaded at the other		W'''	W'''	W'''	0·25 W	0·104 W	4 D	16 d	0·333 D	0·034 W		

The breaking weights, W, W', W'', in the above table, are to be calculated for any particular case by the formulas in general use, using for constants the figures given in tables of the the transverse strength of materials. The deflections, D, D', D'', can be calculated or determined experimentally for a beam supported at both ends and loaded in the middle, when the deflections for other distribution of the load are given at once from the table. The deflections, d, d', d'', are determined in the same way for any load less than the proof, and the table shows the corresponding deflections when this same load is differently applied. By observing the relations given in the table, the load required to produce any deflections within that produced by the proof load can readily be calculated. The safe load assumed in the table is one that is approved by experiment, though somewhat smaller than is often allowed. The following table is calculated for this load, or with a factor of safety of one-third the proof strength:

SAFE LOADS, IN POUNDS, FOR RECTANGULAR BEAMS WHOSE LENGTH BETWEEN SUPPORTS IS l FEET; BREADTH, b INCHES; DEPTH, d INCHES; AND UNSUPPORTED WEIGHT OF THE BEAM, B POUNDS.

Distribution of Load.	Wrought Iron.	Cast Iron.	White Pine.	Oak.
Supported at both ends and loaded in the middle	$333 \times \frac{b \times d^2}{l} - \frac{B}{2}$	$267 \times \frac{b \times d^2}{l} - \frac{B}{2}$	$50 \times \frac{b \times d^2}{l} - \frac{B}{2}$	$67 \times \frac{b \times d^2}{l} - \frac{B}{2}$
Supported at both ends and uniformly loaded	$667 \times \frac{b \times d^2}{l} - B$	$533 \times \frac{b \times d^2}{l} - B$	$100 \times \frac{b \times d^2}{l} - B$	$133 \times \frac{b \times d^2}{l} - B$
Fixed at one end and uniformly loaded	$167 \times \frac{b \times d^2}{l} - B$	$133 \times \frac{b \times d^2}{l} - B$	$25 \times \frac{b \times d^2}{l} - B$	$33 \times \frac{b \times d^2}{l} - B$
Fixed at one end, and loaded at the other	$83 \times \frac{b \times d^2}{l} - \frac{B}{2}$	$67 \times \frac{b \times d^2}{l} - \frac{B}{2}$	$13 \times \frac{b \times d^2}{l} - \frac{B}{2}$	$17 \times \frac{b \times d^2}{l} - \frac{B}{2}$

Before concluding, a few remarks will be made about the factor of safety for the iron used in the construction of steam boilers. The most reliable authorities on this subject state that a factor of six in relation to ultimate strength is the least allowable, while it is more desirable to use a factor of eight. The experiments of Sir William Fairbairn have shown that the strength of a single riveted joint has but 56 per cent. of the strength of the sheet, and that a double riveted joint, properly constructed, has 70 per cent. The average tensile strength of boiler plate, as given above, is 50,000 pounds per square inch, and much is used that falls below this figure. This will give the ultimate strength of the riveted joint, as follows:

Double Riveted	35,000
Single "	28,000

Hence, the greatest allowable working load should be:

Double Riveted	5,833
Single "	4,667

And the best authorities recommend that the working load should not exceed:

In Boilers with Double Riveted Joints	4,375
" " " Single " "	3,500

A committee appointed by the Franklin Institute, of Philadelphia, to determine a safe value for the strain upon steam boilers, have recently reported to that body. They assume the ultimate tensile strength of a single riveted joint to be 34,000 pounds per square inch, and recommend that 6300 pounds per square inch be taken for the working strain. If the foregoing data are correct, this allows a factor of safety of 28,000÷6000=4·67, far below what is generally assumed to be a safe limit. It may well be doubted whether this influential body has not committed a grave error, in pronouncing this opinion.

Hot Pressed Nuts and Washers.—Mr. James Rees has brought suit against Mr. James T. Wood and others, executors of the late James Wood, of Pittsburgh, to recover some $18,000 alleged to be due him for royalty upon a patent for the manufacture of hot pressed nuts and washers. The patent was originally issued to James Rees and Henry Carter (now deceased). Rees subsequently sold his interest in the patent, and was to receive three dollars and thirty-three cents per ton royalty on all nuts manufactured and sold by the purchasers and their assignees. James Wood, in time, became the sole proprietor of the patent. The manufacture and sale of nuts under said letters patent were continued by James Wood until November 7th, when he died, and the same were continued by his legatees, devises or executors down to the 26th of August, 1872, when the letters patent finally expired, during which time large quantities of hot pressed nuts and washers were manufactured and sold, amounting to many thousands of tons; and during this time large sums of money were received by Wood, or those acting under his authority, from others, infringing and manufacturing nuts and washers by the mode and process, machinery and appliances covered and secured by the letters patent. The plaintiff complains that James Wood, during his lifetime, and his executors since his decease, have not rendered to him full and final accounts of the nuts and washers manufactured under the letters patent, and of money received by him, or those acting under his authority, from others, and he believes that upon a full and fair account being taken and settlement made, there would be at least $15,000 to $18,000 coming to him. The case is to be tried.

It is doubtful if there is any other work which contains as complete and reliable data in regard to the strength of materials, in so compact a form.

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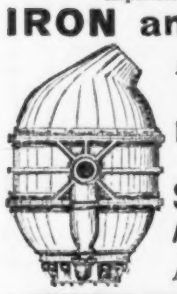
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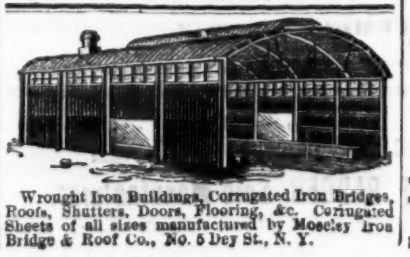
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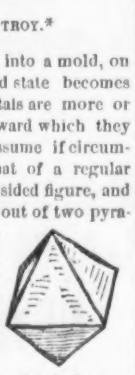
On the Strains which Cause Stove Plates to Crack.

BY WM. J. KEEP, OF TROY.*

Iron which has been poured into a mold, on changing from a liquid to a solid state becomes a mass of crystals. These crystals are more or less irregular, but the form toward which they tend, and which they would assume if circumstances did not prevent, is that of a regular octahedron. This is an eight sided figure, and may be imagined to be formed out of two pyramids having their bases together. I have drawn in Fig. 1 a group of crystals from a pig of iron, among which you see one that has, by the aid of favorable circumstances, succeeded in gaining the natural form. In a perfect crystal of iron all the lines joining the opposite angles are of equal lengths and at right angles to each other. These lines are called the axes of the crystal. An English author of high repute in matters pertaining to iron metallurgy, insists that these axes in iron, zinc and other metals, which crystallize according to the same laws, vary in length, and that one axis becomes longer than the rest. He considers this due to pressure exerted on the sides of the crystal at the time when the melted metal becomes solid, and claims that the longest axis lies in the direction of least pressure. Taking this arrangement to be a fact, he calls this long axis the principal axis of the crystal. It is a fact conceded by all, that the crystals do assemble or group themselves in certain lines, and that these lines of assemblage lie, as before stated, in the direction in which the least pressure is exerted; but whether the crystals themselves turn any particular axis in this direction or not, does not seem to us to be fully determined, and it will not materially affect our reasoning on this subject, as we cannot often distinguish the separate crystals, and we shall only deal with the lines in which the crystals assemble. When we define the direction of these lines as in the direction of least pressure, we deal with pressures due to the mass itself, and heat leaves a mass of iron according to the same law; and, therefore, the lines of assemblage will be in the direction in which heat leaves the body. This direction is always perpendicular to the cooling surface. We can now state the law upon which we shall base all of our reasoning on this part of our subject.



Octahedron.

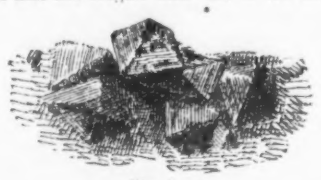


Fig. 1.

In the case of any casting, upon the metal changing from a liquid to a solid state, the crystals arrange themselves in lines perpendicular to the cooling surfaces; or these lines lie in the same direction in which the heat went out of the iron.

If the heat leaves all surfaces of a casting, then each surface will have the lines in which the crystals assemble, and which lie near to it, perpendicular to itself. We may then briefly state the law thus: *The lines about which the crystals assemble are perpendicular to the surfaces of the casting.*

Fig. 2.

Fig. 2 shows you a view of the end of a casting. This shows the assemblage lines, though the individual crystals are too small to be visible. I have generally used zinc for these castings, because the melting point is low, and I, therefore, could perform my experiments with greater ease, and the results are more apparent than in castings of iron. The crystalline structure of the two is the same, and, therefore, what we conclude regarding one is true also of the other, only in a different degree. In this figure you see the lines perpendicular to the bounding surfaces, but what I wish to call your attention to especially is the behavior of these lines at the corners of the casting.

When two surfaces, as in this example, lie at an angle to each other, the systems of perpendiculars must meet in a plane diagonal to those surfaces. Some of the lines of each group run by into the lines of the opposite group, so that in this diagonal plane the lines interlock, breaking up the natural order, and making very poor connection. We shall find in every such case that the diagonal is the weakest part, and that the casting will bear less strain there than through a part where the lines lie parallel to each other. In the figure which we are considering, each corner has its weak line, meeting at the center of the casting.

Fig. 3.

In Fig. 3, we have a drawing of a flat bar, and in it we see the same diagonal lines of weakness. The pairs of diagonals, joining the corners nearest to each other, are joined by a long line parallel to the two long surfaces. This line is also a line of weakness, as the lines in which the crystals assemble in the systems belonging to each surface, begin at the surface, and as the casting cools, elongate toward the center. When they meet in the middle they do not form continuous lines through from one surface to the other. Before leaving this class of surfaces, I wish to refer to Fig. 4, also a drawing of a casting. In this we observe the same phenomena as before at all of the angles except at the angle A. Here the metal lying mostly outside of this angle, the lines which we have been considering are perpendicular to the surfaces forming this angle A, and extend beyond the angle until they interlock, as before, and, together with the diagonal from the corner B, form a weak line the entire distance from A to B. Now, though there is much more metal between A and B than between A and C, yet the casting will always break through A B, rather than through A C, the break taking the longer course.

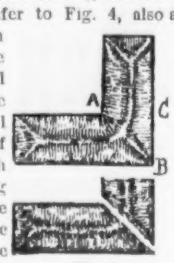


Fig. 4.

Castings may be made which will not show this peculiar appearance, and may not have it in any marked degree, but if such castings are exposed to heat, the crystals will change position and assemble in lines perpendicular to the surfaces through which heat entered the casting. The greater the heat, the more marked will be this peculiar structure, and the law, as before stated, applies equally in this case, all the crystals finally assembling in lines perpendicular to the bounding surfaces which were heated.

This can be illustrated in the following manner: Take two pieces of zinc which have been rolled into a sheet, and heat one of them just below the melting point. To make what I am going to say illustrate the point in question, it must be remarked that rolling any metal into a sheet elongates each crystal in a direction perpendicular to the pressure exerted in rolling—that is, lengthwise of the sheet; and if metal is drawn into wire the crystals are lengthened in the same way. If you bend the piece of zinc that has not been heated, you will find that it is tough and can be bent many times without breaking, the crystals running lengthwise. Take the other piece of zinc that has been exposed to heat. In it the crystals have turned round, and have formed themselves in lines perpendicular to the surface through which heat entered, and you will find that it breaks when it is bent.

The peculiar crystalline structure to which we have referred is varied somewhat by the quality of the metal used, but it depends more directly upon the amount of heat either passing out of or into a casting, or upon the rapidity with which the operation is performed.

Fig. 5.

In a car wheel, a diminutive drawing of which is given in Fig. 5, these lines penetrate so as to be visible for one to two inches. We see from the foregoing remarks that the strength of a casting is greatly impaired by the lines of weakness caused by angles, especially re-entrant angles, such as we have referred to in Fig. 4.

Now let us look for a means of remedy. Referring again to Fig. 2, and then to Fig. 6, or comparing Figs. 3 and 7, we see that by making the angles into curves, the lines in which the crystals form themselves are all nearly parallel to each other, and the absence of abrupt changes of surface also avoids changes in crystalline arrangement, which will materially affect the strength of the casting. Compare Fig. 4 with Fig. 8, and you see that there is the same amount of metal through A B, in Fig. 8, as there is through A C, and yet the strength at the two places is nearly the same. Of course, any change of form produces a corresponding derangement of crystalline structure, but the defect which in Fig. 4 was concentrated in the line A B, is in Fig. 8 spread out between the points C and D, so that no single point is much weaker than a similar point beyond C or

Fig. 6.

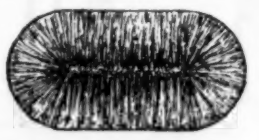


Fig. 7.

All stove manufacturers have in their minds facts enough to prove that what has been said is true; but I will mention one case which occurred during the erection of one of the tubes of which the Britannia Bridge is composed. In raising this tube a hydraulic press was used, the cylinder of which had a bottom formed as is shown in Fig. 9. When pressure was applied the bottom went out, breaking where we would be led to expect it would, through from the inner to the outer angle, as we have shown in Fig. 10, though metal was in excess at that part. A new cylinder was cast, having a semi-spherical bottom, a section of which you see in Fig. 11, and although it was not as thick in the part where the first cylinder broke, yet it sustained a much greater strain without giving way.

Fig. 8.

It is hardly necessary for me to make the application to one special branch of founding more fully than I have done already. In making patterns for whatever kind of castings, the greatest care should be taken to avoid all angles, of whatever size or shape, for, as has been said already, every change of form brings its corresponding lines of weakness. If curves are necessary, the larger they are the better.

Many of the catastrophes which result from the falling of bridges, or of buildings, might be avoided if this matter had received proper consideration.

For example, it is required to cast a bar with a hole through it. To make up for the iron lost by the hole the pattern maker adds a square piece to the top of the pattern, as is shown in Fig. 12. When strain is put upon the bar it breaks through one of the angles at A or B, and it is found that the bar is weakened by the addition more than by the loss of iron which the hole occasioned. The bar shown in Fig. 13 would have been better.

In making the patterns for an iron box, if the sides are joined by curves instead of angles, the box will be very much stronger. Our stove tops crack. Where? Through the sharp angles where the centers lie. Often they crack through the rod hole, taking the longest track. The strain of the rod no doubt exerts an influence, and there are other strains at work, of which we shall presently speak, but under the top and near the rod two heavy flanges join at a right angle. When the combined action of all these strains, and of the heat expanding the portion nearest the fire, are brought upon this weak right angle, away it goes, and a new top must go to that customer free.

Fig. 9.

I will now treat of another subject, which is quite as important as the one we have been considering, and this is the effect of shrinkage upon castings.

For the strongest castings iron of a close uniform grain is best, but to get equal strength in a heavy and a light casting, the quality of the iron must be varied, for the iron which would show a good grain in a small casting would show a coarse grain in a large one, and consequently it would not be as strong, proportionately, as the small one.

Fig. 10.

In gray cast iron the crystals are arranged helter skelter, and along with them we find carbon which is not combined with the iron, in the form of graphite. In white iron the crystals are smaller and much more regular. In steel the crystals are so regular that the angles of each crystal fit into the cavities made by those next to it. In some brands of steel the regularity is such that if a fractured end be held to a strong light, the parallel facets will reflect the light in lines which resemble bundles of needles. Late writers conclude, from carefully conducted experiments, that the amount of carbon in gray and white iron is about the same. Pig iron, made at a low temperature, is stronger than that which is made at a high temperature. No. 1 pig is made at a higher temperature than No. 2, and is not as strong; first, because the grain is coarse, and each crystal is more or less separated from the rest by thin plates of graphite, and partly because the iron at the high temperature has taken up impurities and earthy matters.

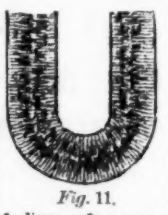


Fig. 11.

I might speak of the red and cold shortness of irons used in different localities, or the benefits arising from using irons containing phosphorus for small castings, or of the qualities of ores that would make pigs best fitted for our work, but if I should do so, I should wound the feelings of many and inaugurate a discussion which could be settled only by allowing each to say that the special grades which he used possessed special advantages.

I am, however, in this paper, to treat only of the internal strains which cause castings to crack, and it is enough to say that a strong fluid iron, having the least possible shrinkage, is what each manufacturer wishes his customers to think he uses, and as regards the selection and mixture of irons, each thinks he understands the business best, and therefore I shall only touch on these points in so far as they affect the strains of which we are speaking.

All will agree with me that the best iron for stoves, or for almost any other casting, is that which shrinks least.

Fig. 12.

Iron is one of those metals, like antimony and zinc, that occupy less space when melted than when solid, that is, it expands on becoming solid, and for fine castings this is a favorable feature, as this expansion occurs at the instant of change and fills every part of the mold. Now, bearing this in mind, that the metal has expanded and fills more space than it did when fluid, also remember the fact that all solids, up to the melting point, expand to a certain extent for every degree of heat which they contain, and the casting just cooled below the melting point contains an immense amount of heat, and is tremendously expanded by such heat. Now, as another point, bear in mind that the iron which fuses at the lowest temperature is expanded by heat at the moment of cooling the least, because it contains less heat, and we conclude, therefore, that the iron which melts at the lowest temperature has the least shrinkage. Here, then, we have the key to avoiding shrinkages, and we see that the greatest care should be taken not to heat the iron hotter than is necessary to cause it to fill the mold, for every unnecessary degree of heat that the iron contains, when poured, will cause that proportion of additional shrinkage.

Much of the cracking caused by internal strains within the casting results from ignorance in mixing different brands of iron, and, perhaps, also, in the use of scrap. Irons are often melted together, having totally different fusibilities. Such irons will often mix together, but will not combine with each other, and each occupies different parts of the casting. These irons, having different melting points, will shrink differently, and not having become united into one homogeneous body, but existing separately, each one will pull on the other, and, if possible, pull completely away, causing the casting to break. No. 1 iron has a higher melting point that No. 2 made from the same ores, and not only do different grades and brands

Fig. 13.

of iron shrink differently, but of castings poured from the same metal a small casting will shrink more than a heavy one; the reason of which will be apparent when we come to a discussion of Fig. 15. Excess of heat in every case, however, increases shrinkage, and, as has been said before, the lower the melting point the less the shrinkage; yet experiments show, as in the case of other alloys, that a mixture of two brands of iron may have a lower melting point than either of them, when used separately, and, on the other hand, a mixture of a number of brands of iron may have a higher melting point than any one of the brands used singly. Experimenters say that charcoal iron has a higher melting point than coke iron, but we are not, perhaps, safe in following this conclusion in all cases.

Returning to the statement that of castings poured from the same iron the light shrinks more than the heavy casting, from this we learn that in making a pattern no part should be thicker than another. This, in practice, is not possible to do, but referring to Fig. 14, which shows a casting with one part thick and one part thin, we shall see the evil of this construc-

Fig. 14.

tion. *Mark: The thin part shrinks most, as it cools first.*

The thin part cooling and shrinking down to its final dimensions, leaves the thick portion expanded and partially molten. When this thick part does cool down, the particles next to the thin part in the line A B endeavor, whether they succeed or not, to slide upon, or break away from, the part already cool. This may cause the thin portion to buckle, or it may possibly remain straight, but the violent internal strain will tend to break asunder the two parts of the casting whenever it receives a jar, or is subjected to any additional strain by being heated, or from other causes.

This is applicable to all stove tops when the flanges in which the covers set are heavier than the rest of the plate. The impression may be made upon the purchaser that he is buying a durable stove with heavy castings, but experience shows that such tops crack when exposed to heat. Flanges, or thickening on any part of a casting, act in the same manner.

A sprue often keeps a part of a casting near it hot until the iron is set all around it. When it shrinks it pulls away from the rest of the casting, provided the piece cannot warp, and will cause a crack either alongside of, or directly under, the sprue. At the late Exposition at Chicago I saw a row of eight parlor stoves, and if I recollect aright, four of these contained ash-pans, having a long crack by the side of each sprue print.

Castings made from patterns which are made in an improper manner often crack in the molds, and if not, may crack when completely cold, or when they receive a slight shock.

To gain an idea of the tremendous strains to which castings are subjected from these causes, it is only necessary to remember that a casting shrinks from 1-100 to 1-120 of its dimensions in cooling.

Such castings which have received internal strains from unequal shrinkage, may, if left alone for a long time, lose a portion of their strain by the particles of the iron gradually changing position, so as to accommodate themselves to the power exerted upon them, but in this case, if any part be cut away, the casting may fly in pieces.

Before closing this discussion, and to explain why a thick casting does not shrink as much as a thin one, that cools all together and suddenly, I will show you a section of the casting of a cylinder of iron of quite large dimensions, such as are made for mill rolls, etc. You will see this in Fig. 15.

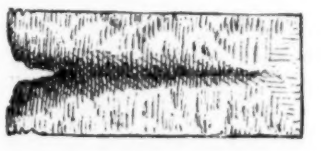


Fig. 15.

In this case there are no angles by which lines of weakness are produced. After the metal is poured it cools first on the outside surface next to the mold, forming a rigid shell filled with molten metal. This part being colder than the interior has contracted, and forced the metal in the interior to rise; but the next portion on cooling tends to shrink away from the portion already cooled, causing a strain between the two portions, and this is the case with every portion of the casting as it cools toward the center.

But we are treating the case as though the metal cooled in separate layers, while the fact is that every individual particle or crystal cools and tries to pull away from the crystals next to it, so that as the central portion is reached the crystals are not able to reach from one to the other; and, finally, as this operation progresses, cavities of various sizes and forms are left.

These may be partially filled by feeding more metal, but, in any case, the tendency of each part to pull away from the rest is very great, and the metal at the center is coarse and loose and very weak.

The central portion of such casting may sometimes be picked to pieces with the hand. The rigid shell first forming, and the consequent loose structure of the central portion, explains why a large casting does not shrink as much as a small one.

The application of these remarks on shrinkage is exceedingly varied, and each can calculate the probable effects on any particular form.

Of course, in light castings, strains of the character just illustrated by Fig. 15 are not very great, but the principle is the same everywhere, and such examples may aid the imagination in seeing strains where they would be overlooked without these hints. The subject of shrinkage is very interesting, and any amount of study that may be bestowed upon it will be well applied. We could not more than introduce the subject to you if it had been considered alone, as the field is broad and has been explored but little. Scientific men have chosen to confine their attention to other matters, and the subject of remelting cast iron has received little of their attention.

* Read before the National Association of Stove Manufacturers, at Albany, Feb. 12th, 1874.

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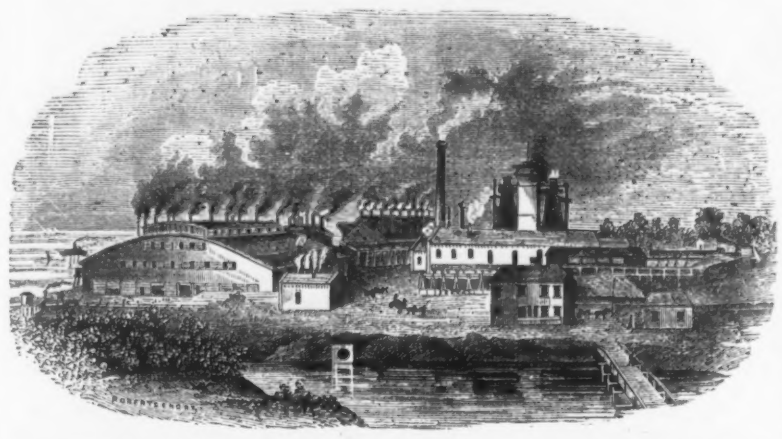

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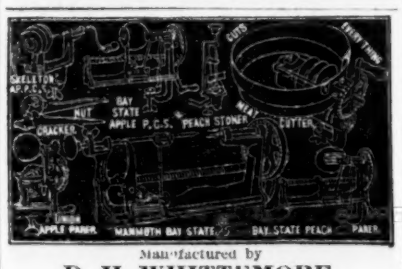

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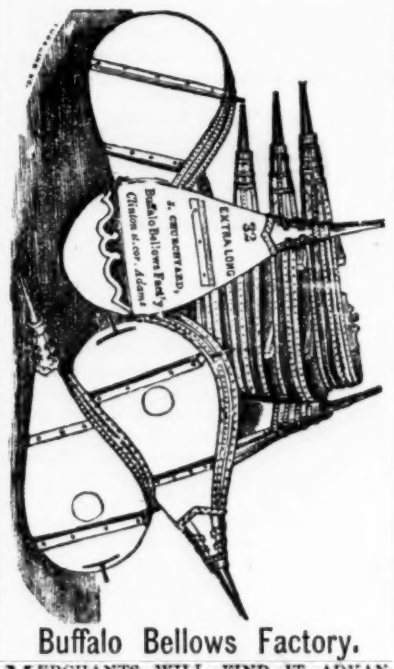

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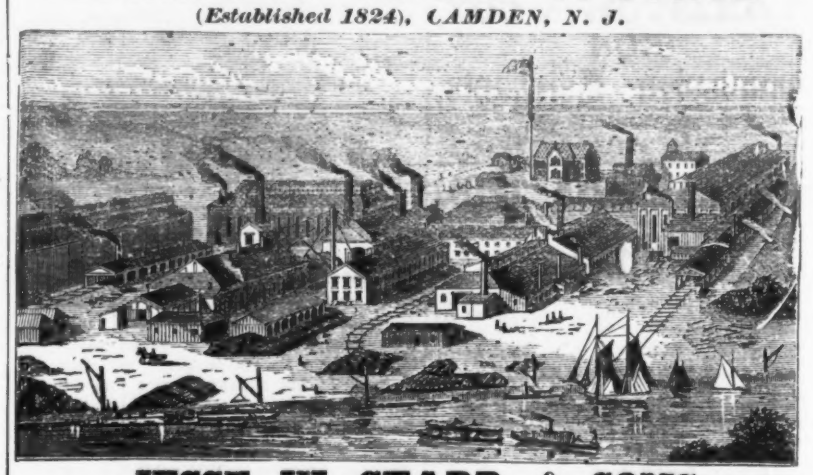

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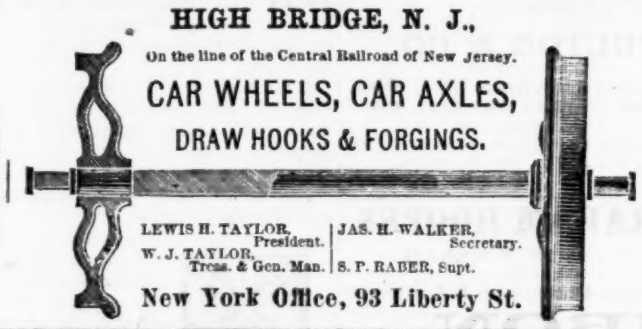

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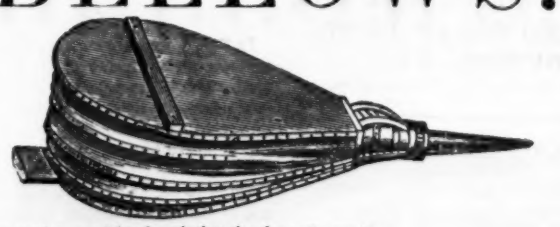

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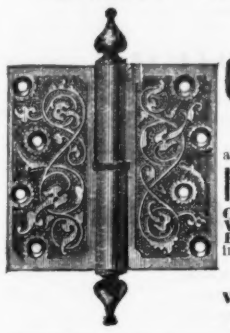

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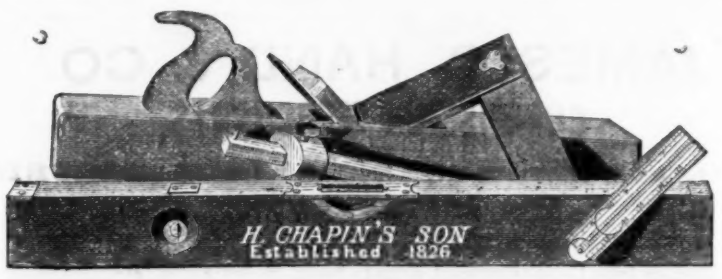

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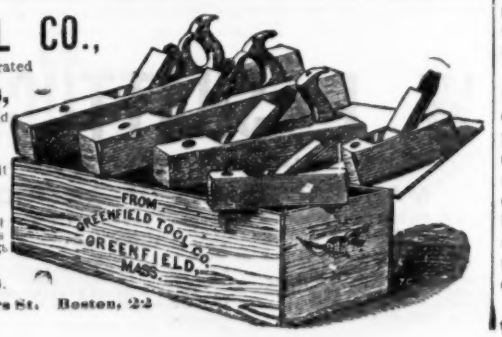


Protection of Iron Columns from Fire.

We extract the following from *The Engineer* of January 30th:

There is a source of danger and of ultimate destruction to all cast iron in buildings, in the position of either columns or girders, which mere strength and proper proportions are no safeguard against. We allude to fire. Cast iron, heated to a very high temperature, when supporting a load, may not suffer the change of condition altogether with impunity; but when, in addition, sudden jets of cold water are thrown upon it in its heated state, its situation becomes perilous. One of the best authorities on questions of fire and its effects upon constructive materials of different descriptions, states that an oak post, well plastered over, is well nigh unin flammable. Unfortunately, oak posts or oak columns or girders cannot be obtained of sufficient size, combined with the required strength, to do duty in the place of iron. Nevertheless, this statement is in accordance with the plan proposed for surrounding columns of cast iron or other material with a protecting casing or covering of some sort, capable, in the case of their being exposed to fire, of preserving them intact, or at any rate comparatively so. A method by which this protection may be insured is that of Messrs. Robert Dennett & Co.

The accompanying cuts will render the explanation clear. In Figs. 1 and 2 the column C is first provided at intervals with vertical pieces of corrugated hoop iron F, which are retained in position while the concrete casing is in progress, by horizontal rows of wire binding them to the circumference of the column. The concrete casing is 3¼ in. in thickness, and the object of the corrugated hoop iron is evidently to cause it to bend, and to avoid the possibility of a straight joint all around the circumference of the column. In Figs 3 and 4 the arrangement is somewhat different. In the place of the corrugated hoop iron, fillets of wood B, B, are employed, and held in place by a wrapping of iron wire mesh. It will be observed that in this case the thickness of the concrete is reduced to 1¾ in. If these fillets of wood be supposed to be plastered, they are very much in the position of the oak post already alluded to.

FIG. 1.

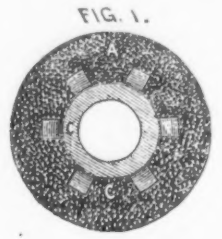


FIG. 3.

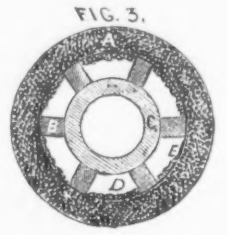


FIG. 2.

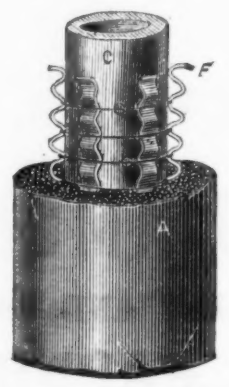
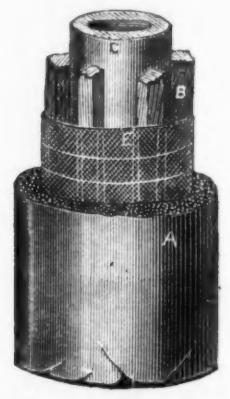


FIG. 4.



FIRE PROOF CASING FOR IRON COLUMNS.

The relative value of these two arrangements will be perceived from the results of the following experiment, which was carried out at Nottingham. Three hollow cast iron columns were selected, which, for the sake of distinction, may be termed A, B, and C. The two former were similar in dimensions, being about 10 ft. in length, and having an external diameter of 7¼ in. The column A was encased with a solid mass of concrete 3½ in. in thickness, as shown in Figs. 1 and 2. The column B was encased, as shown in Figs. 3 and 4. In both instances the material was floated on and the face trowelled. The column A and B were fixed erect on the ground about 4 ft. apart, and their caps and bases were entirely enclosed by the concrete.

The column C was encased in a manner exactly similar to A, but the concrete was laid thereon only a week before the experiment, whereas A and B had been encased a month previously. Strips of lead were fixed vertically along the whole length of each column under the concrete and in contact with the iron; it being fairly assumed that if the lead were prevented by the protection of the encasement from melting, a temperature would be preserved below that which could injuriously affect cast iron.

A gauge-rod with a self-registering card and pencil were placed inside each of the colums A and B, for the purpose of testing the expansion of the iron lengthwise. All three colums stood within a distance of a few feet from each other, and a fire of wood and shavings saturated with gas-tar was lighted around their bases and maintained at as fierce a degree of heat as possible for a space of four and a half hours.

After the fire had been burning about an hour the hollow encasement of column B showed a crack about 3 ft. in length. This was caused, probably, by the expansion of heated air or steam within the hollow space, the experimenters having inadvertently omitted to form escape holes in the concrete casing, as had been intended. No signs of injury to the encasement of columns A and C were visible, although the flames reached above the caps of the columns.

After two hours had elapsed it was determined to have one of the columns laid horizontal in the middle of the fire, so as to insure an uniformly intense degree of heat along its whole length, as the other colums when in an upright position were obviously more severely affected for a few feet above their bases than near their caps. The column C was therefore pushed over so as to lie horizontally in the fire, and remained in that position until the close of the experiment.

The fire was eventually extinguished by a quantity of water thrown on suddenly, and a careful examination showed that no cracking, blowing, or disintegration of the concrete had resulted from this severe test. Portions of the concrete were then removed as speedily as possible from each column. In no case had the strips of lead melted, nor did they show the least sign of injury. The hand could, immediately after the removal of the concrete, be borne on its inner surface or upon the iron columns without discomfort; and the registering cards attached to the ends of the gauge-rods showed no indication whatever of expansion.

The wood fillet immediately opposite the crack in the casing of column B was charred somewhat on its outer edge; the sides and the edge of this fillet next the iron, as well as the two adjacent fillets, were discolored by smoke for 2 ft. or 3 ft. of their length, and the other fillets remained as white as when they came from the saw. A strip of lead near to the crack in the encasement of column B, and another strip in that side of column C which had been laid downward to the fire, were considered to have suffered the most severe test, but neither of these strips showed indications of melting, and were removed by the hand without inconvenience.

The Coal and Iron of Virginia.

We condense the following from an address lately delivered by Prof. D. T. Ansted, before the Society of Arts:

It is one of the peculiarities of the Virginian mineral fields that the principal minerals are generally accessible above the water level. No borings are needed to prove the presence of the minerals, no shafts required to reach them, no pumping to drain them, and no machinery to open and work them. They are easily and naturally ventilated. The exceptions to this condition are chiefly in the small coal fields near Richmond, the gold districts in and near Buckingham, and the salt in the Kanawha. The magnificent and abundant iron ores, and the boundless wealth of the Appalachian coal fields, are of enormously greater importance than the comparatively small resources of the Richmond coal fields, the gold of Virginia, or the miscellaneous minerals, many of them only rendered useful by the coal and iron. The iron in the East and the coal in the West, then, must be looked on as the principal minerals to which the two States of Virginia and Western Virginia will owe their future importance. The principal deposits of both are crossed nearly at right angles by the line of the Chesapeake and Ohio Railroad. They are thus brought into immediate contact with each other and with the outer world. The iron country of Virginia occupies two distinct geological positions, and the ores are of different kinds. East of the Blue Ridge, which is the easternmost mountain chain of North America, there are bands of magnetite, not absolutely continuous at the surface, but visible and traceable by their contents for a considerable distance, ranging northeast and southwest, and crossed by the rail near Charlottesville, about 100 miles from Richmond. At frequent intervals, within a breadth of about 20 miles, are ridges rising as much as 200 feet above the valleys, having a core of hard, compact iron ore of the finest quality, often yielding much more than 50 per cent. of metallic iron in the furnace. These ores are chiefly peroxides, with a small admixture of protoxide of iron, and very small quantities of silica.

Between Charlottesville and Lynchburg there are ores well adapted for the manufacture of steel by Siemens' process, but capital has not yet enabled the iron master to avail himself of this source of wealth. He has little doubt that in a few years steel rails will be manufactured there on a large scale and at great profit by both the Bessemer and Siemens processes. The Blue Ridge forms a natural boundary, beyond which this class of ore does not pass in Virginia. To the west of this chain, however, and in the broad, rich valley that extends in this direction to the Appalachian Mountains, there is a group of Silurian and Devonian rock squeezed into folds, and containing at intervals, for about 50 miles, an important band of brown hematite, and a thinner deposit of rich peroxide of iron. These are repeated in some places three times, and in each repetition contain singularly rich and valuable deposits of ore, the hematites being sometimes more than 40 feet thick, and yielding generally from 40 to 50 per cent. of metal. This great bed is found to extend from Pennsylvania through Eastern Ohio and Virginia to Kentucky. From similar ore found further north some of the finest iron of Pennsylvania has been made, but in the northern part of its range the use of it has been checked by the cost of fuel. In Kentucky and Tennessee, however, where these ores have come into use, and in the few parts of Virginia where furnaces had also been erected previous to the opening of the Chesapeake and Ohio Railway, charcoal was the only fuel employed. The splint coal of the Kanawha has now been substituted in these same furnaces for charcoal, without lowering the quality of the iron. The hematite belt commences as you leave the valley of Virginia, a little west of Staunton, and the first deposits of ore of importance come in at a distance of about 10 miles from that town. A considerable number of properties within this belt, and near the rail, have been purchased by Pennsylvania and New York capitalists, some for actual work, others for speculative sales, and in a few years the railway will be lined on both sides with furnaces. In most of these places the ore is quarried, and has a thickness of very many yards. It exists in bluffs, forming the nucleus of low hills 200 or 250 feet above the general surface, and can be obtained with exceeding facility. In many cases limestone bands alternate with the ironstone. At each recurrence of the deposit there are, certainly, millions of tons of ore within a very moderate distance of the railway.

But the iron ore cannot be properly utilized without coal. In Virginia the deposits of coal are not large, and it is certain that to ensure a large make of iron the coals of Western Virginia must be brought to the iron ores of Virginia, or the converse. The cost of conveyance is about the same for coal and ores, and thus, if required, a double business may be carried on with advantage. The most westerly iron ores are about 100 miles from the most easterly coals, but the most easterly coals are not the best, as they consist of beds of only moderate thickness and few in number, underlying the Mahoning sandstone, which is a hard band of gritstone, separating the lower from the middle coal measures. The best coals seem to be the coals of the middle measures. There are, however, good and promising seams of tender coal now being opened at a distance of about 100 miles from the iron ores. The coal, then, is separated from the iron ore in Virginia by a railway distance of 100 miles. Geologically, the distance is greater here than further north, where the lower coal measures are better developed, but where the middle measures are absent. An important fault, removing a considerable thickness of rock, brings the two minerals together. The lower coal measures comprise about five seams, one or two of them as much as 5 ft. thick, generally of tender coal, believed to be well adapted for coking, but hardly yet sufficiently proved. These measures dip to the northwest, at an angle of about 1 in 100, and are terminated upward by a hard and thick bed of sandstone, believed to be the Mahoning sandstone of Rogers. It is above this sandstone that we find the noble series of the middle Appalachian coal field, as shown in the Kanawha Valley. Commencing at Mill Creek, near Hawk's Nest station of the Chesapeake and Ohio Railway, we find in Gauley Mountain, which rises behind the station to the west to a hight of 2500 ft. above the railway, an unusual thickness of workable and valuable seams. There is here about 60 ft. of workable coal in a number of seams within a thickness of about 800 ft. of measures. One of the lowest workable seams has been lately opened for work, and is found to contain, about 1000 ft. above the railway, at least 10 ft. of hard, compact coal, of the splint and bituminous varieties, and above this are other seams equally valuable. The upper seams include cannel.

From the mouth of the Gauley down the River Kanawha the whole country consists of coal lands for 50 miles. The great plateau is intersected not only by the Kanawha, but by many other streams more or less accessible, and is traversed along the Kanawha Valley by the railroad. The coal lands contain for a long distance the whole, or nearly the whole, series, and for a long way almost the whole series is available above the water level. It is not unlikely that some of the coal seams pass occasionally into cannel, and occasionally into iron ore of the blackband variety. Cabin Creek, Elk River and Coal River are three considerable tributaries of the Kanawha, penetrating the country for a long distance, and bringing into convenient working position many scores of thousands of acres of valuable coal land. The two latter are partly navigable, but there cannot be a doubt that before long all of them will be supplied with railroads, by which the coal will be brought into the market. They lay bare some of the finest deposits of cannel coal in America. Near Charleston there is another source of mineral wealth. The manufacture of salt is carried on here, and there is room for many other manufactures of even greater importance. The coal here, as in too many places in and near the Kanawha, comes close to the water level, and the beds are unfractured and nearly horizontal. The quality is also excellent, and the valuable upper seams, which generally include cannel, are close at hand, and may be obtained by very deep mining. The railway crosses this tract for a distance of some miles. The river here is navigable for ten months in the year, and the distance from the Ohio is only 50 miles by rail, and is little more by water. The salt manufactured from the brine of the Kanawha Valley has been much valued for the curing of meat, and the mother liquor contains large doses of bromides. At present the manufacture is little developed, though of long standing, but no place could be selected better adapted for chemical works, and the site is available for many purposes. Removed at present from existing lines of communication, but likely to be rendered accessible before long, are tens of thousands of acres of valuable land covered with timber and abounding in mineral wealth. Large tracts of this kind exchanged hands a few years ago at merely nominal prices, but are already acquiring a sensible value, and few better investments could be made by those willing to leave capital idle for a few years than the purchase of these lands at present prices. At a cost varying from $3 to $50 per acre, property may now be acquired that, a few years hence, will be saleable at twenty times that amount.

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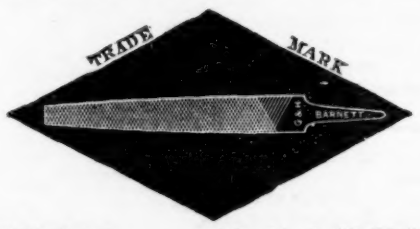

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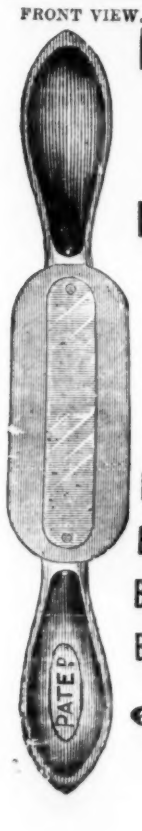

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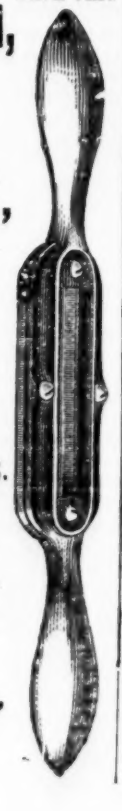

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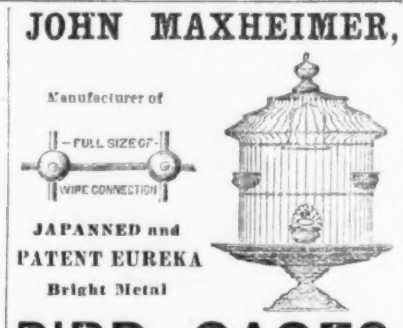

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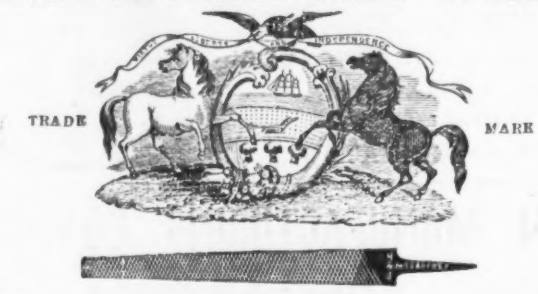

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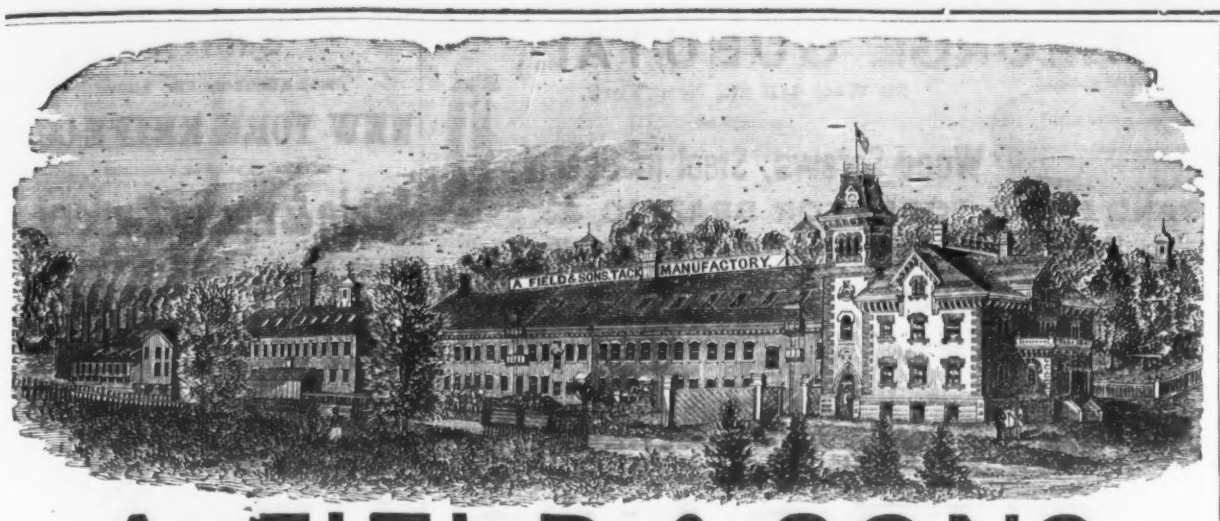

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BUSINESS ITEMS.

NEW YORK.

The Rochester Axle Company employs 24 hands in the manufacture of taper axles, using 300 tons of iron a year, and making 12,000 complete sets of iron and steel axles during the same period.

It is expected that a company will be organized for the purpose of building two blast furnaces in Syracuse.

The Delamater Iron Works, New York, have over 700 men on their pay roll at the present time. Included in the work they are now turning out are the two steamers which are to run from New Bedford to New York, which are to have the Corliss valves; one side wheel steamer to run from Fall River to Providence, and one steamer for the Portland line.

Whitehill, Smith & Hampson, of Newburgh, employ, in busy seasons, about 140 hands in the manufacture of stationary and portable engines and boilers, together with hoisting engines, water wheels, &c. Their foundry has a capacity of seven to eight tons per day, their work in this department including a large assortment of castings and fittings for saw and grist mills, and those for the Excelsior lawn mowers.

PENNSYLVANIA.

With a view to making a speciality of locomotive engines, the Pittsburgh and McKeesport Car Company, of McKeesport, is about to enlarge its works. The company makes cars and pit wagons, railroad frogs and rollers, and other articles of machinery.

The Harrisburg Car Manufacturing Company's employees commenced working ten hours a day on Monday.

Pottsville has formed a company for the manufacture of shoes, and work on the building will begin at once.

Stack No. 1 of the Glendon Iron Company, Easton, was started last week.

Half of the puddling furnaces in the Catasauqua Rolling Mill are now at work.

The Bellefonte Foundry has resumed operations with a full force of hands.

Alexander Bradley & Co.'s stove factory, at Pittsburgh, resumes work with 140 men, or about half the usual force.

MASSACHUSETTS.

The machine shops in Hopedale have been running full time since the first week in January, and without reduction of wages, and have, it is said, orders already received sufficient to require a full production for several months to come.

The Albian Lead Works, in Dighton, are so driven with business that they run 24 hours a day, employing two sets of hands.

The Ames Shovel Works, at Easton, have started on full time, and will so continue until further notice. The indications are that the coming year will be a busy one.

CONNECTICUT.

The capacity of the Woodruff Iron Works, at Hartford, has been largely increased during the past three months. A new engine of 125 horse-power and a new boiler have been put in, and they are now running on extra time, in order to supply the demand for their products. A specialty is made of the manufacture of steam engines and boilers, and a pair of compound engines are now building for one of the new sloops-of-war in process of construction for the Navy Department.

The shop built by the Connecticut Valley Hardware Manufacturing Company, at Chester, is to be occupied for the manufacture of spring beds.

The Eagle Lock Company, of Terryville, will commence at once the building of a new brick shop, which will be ready for work early in the summer.

Merrit Brooks, of Chester, has leased his screw, hook, and eye manufactory to Wm. N. Clark & Sons, who introduce new machinery.

The Magoon Heater Company, of Hartford, has been formed, with $2,000,000 capital, for the manufacture of the Magoon patent feed-water heating apparatus for locomotive steam engines.

For several months past the Pratt & Whitney Company, of Hartford, have been engaged in the manufacture of gun machinery for the Prussian government, with which they have made four contracts. The first of these, amounting to $400,000, has just been completed. The company at present have about 500 men in their employ. Already work to the amount of about $125,000 has been turned out this year, and the average amount per month will be between $60,000 and $70,000 for the remainder of the year.

At Waltham, on Friday last, a fire destroyed the iron, brass and copper foundry of R. G. Brown & Co., and also the machine shop of Field Brothers, which was in the same building. The loss is reported to be from $16,000 to $20,000, covered partially by insurance.

OHIO.

It is now four weeks since Belfont Furnace went into blast with a reconstructed stack, and the experience thus far has been very delightful to the company. For three weeks the furnace, on 2¼ lb. blast, has been making about 32 tons of most excellent metal every day. But the beauty of the operation lies in the fact that there have been used only 51 bushels of coal to the ton of metal. This low ratio of fuel to product is, probably, not attained by any furnace in the United States, and it is even questionable whether the Ferrie plan would secure better results. The furnace has, on an average, been using 4250 lbs. of coal to 4550 lbs. of ore, not counting the limestone. The blast is uniformly low, and everything about the furnace has been working in the smoothest manner. It would be interesting to know if there is any furnace that has obtained a greater saving of coal. We may add that, yesterday and the day before, the production was 36 tons daily, with the blast and burden unchanged.—*Ironton (O.) Register.*

The heaters and rollers at the Ironton and Lawrence Mills having failed to accept the Cincinnati proposition by the 20th, were discharged, in accordance with the spirit of the resolutions adopted at the Louisville meeting. At both mills the proprietors and interested operatives come together and talked over their differences in the most friendly spirit; the former showing how it was impossible, without great loss, to run the mills at the wages demanded, the latter candidly informing the managers that they would cheerfully submit to having their places filled by those who were willing to accept lower rates, but, under the circumstances, they felt in honor bound not to accede. The men were then discharged. The number so dismissed was about ten at each mill. Most of these men are old citizens, upright and esteemed. The proprietors express sadness at the separation, but they view the matter as one of those important dilemmas when old and warm associations must be sacrificed to the cold demands of business. And, in a similar spirit, do the operatives, from their standpoint, regard the affair. We hope that the wheel of fortune will yet turn out some card upon which the parties can harmonize, but that is unlooked for. The Louisville resolutions do not provide for bridging the chasm. As the matter stands now, these men cannot get employment at any of the establishments represented at the Louisville meeting. The mills here have no arrangements by which the vacant places will be filled.—*Ironton (O.) Register.*

The business of the Ohio Cable and Chain Company, Newburgh, has increased so rapidly that it has necessitated the removal of their works to more spacious quarters. The company manufacture cable, coil and log chains, railroad pins, couplings, anchor shackles and swivels, and, in fact, everything in that line.

Brown, Bonnell & Co. have recently added to the nail-making department of their works four new nail cutting machines, making 36 now in operation. Their mill is running on full time in all its departments.

The rolling mill at Marietta will soon be in full operation.

Cartwright, McCurdy & Co., of the Enterprise Rolling Mill, Youngstown, intend to begin work at once on their new mill. They made preparations for so doing last fall, but deferred beginning at that time on account of the panic.

The Pomeroy Rolling Mill, employing 150 men, has resumed work.

The Cleveland Rolling Mill Company have reduced the wages of their employees to $1·80 per day from $2. A strike is the result.

INDIANA.

A contract has been made with the Indianapolis Rolling Mill Company to furnish rails for the section of railroad from Rockport, northeast to the Spencer county line, a distance of about 25 miles.

The rolling mill in New Albany, which has been idle, is now again in operation and employs 250 men.

MICHIGAN.

The new furnace of the Iron Cliffs Company, at Negaunee, which is excelled by few in any section of the country, is nearly ready to begin work.

MARYLAND.

Denmead & Son's Machine Works, at Baltimore, at present employ 300 men. The lot occupied by the machine shop and foundry is 200 feet square, and that covered by the boiler shop, smith shop, etc., is 100x275 feet in dimensions.

VIRGINIA.

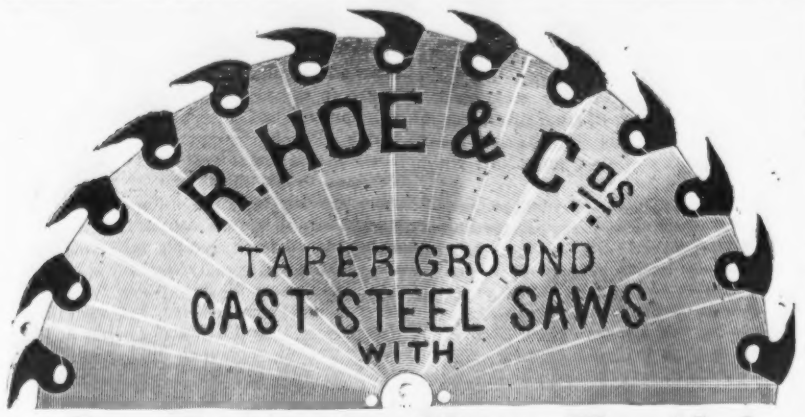
The plate and bar mill and nail factory on Belle Isle, are at work. The puddlers are still on a strike.

UTAH.

An iron company is being organized by Milwaukee capitalists, to operate at Ogden. It is proposed to have a capital of $250,000, $170,000 of which has already been subscribed.

A patent has been recently obtained in France for obtaining alloys of iron with manganese, titanium, tungsten, ilicium, &c. According to the *Revue Industrielle*, scrap iron and iron turnings and filings, or iron sponge coarsely pulverized, are mixed with minerals containing the manganese, tungsten, titanium, or silicium, also pulverized, in suitable proportions, and moistened uniformly and completely with an ammoniacal or an acid solution, after which the mass is compressed in molds. Great evolution of heat takes place, and in a few hours a hard, compact mass results, which is broken into fragments with a sledge. These fragments do not disaggregate at the temperature of melting iron. They are used in a peculiarly constructed high furnace, and when reduced yield excellent alloys. The ferro-manganese contains at pleasure from 20 to 75 per cent. manganese, and in the same way ferro-silicium containing 22 per cent. of silicium has been obtained. Alloys of titanium and tungsten, or of all combined, are readily procurable. The temperature required is very high.

The Virginia *Chronicle* tells the following story: At the new Almaden Quicksilver Works, some years ago, it became necessary to pull down a portion of the old retorting furnaces to make room for other machinery. Upon investigation it was discovered that the ground where the furnaces had stood was completely saturated with quicksilver. The company set a body of hands at work upon the spot with hydraulic pipes, and the amount of quicksilver which was sluiced out in a short space of time was prodigious. The deeper the work proceeded the richer was the yield of mercury. Points were reached where the liquid metal could be dipped up with ladles, (?) and it was ascertained that even the bed rock—a soft tertiary sandstone—was completely saturated with the liquid mineral. Much of this porous rock was quarried and retorted, but at length the cost of the work exceeded the profit, and the work was abandoned.



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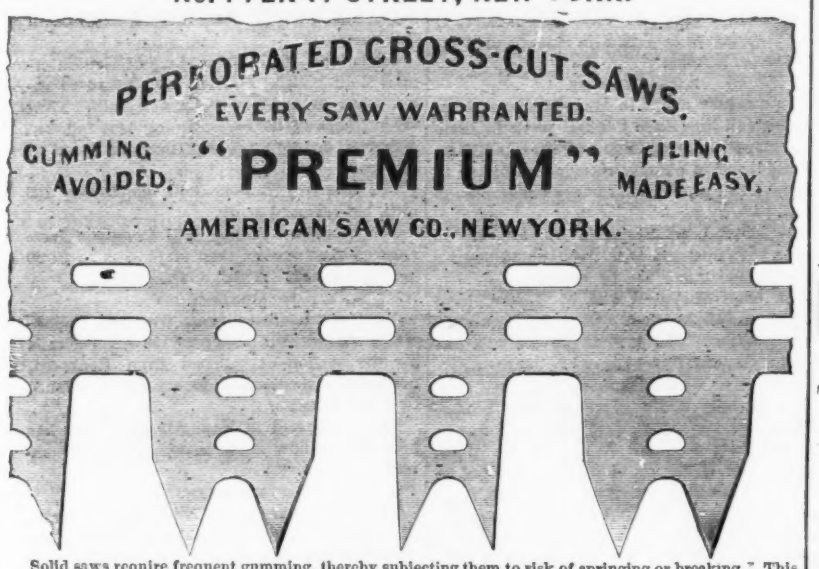
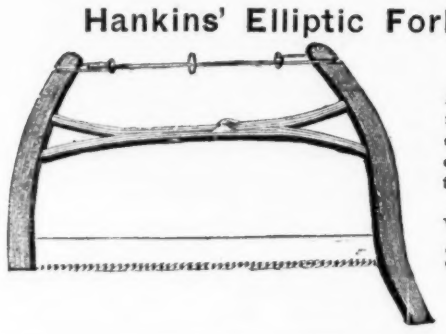


Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking." This especially the case with cross cuts having *Patent Teeth*. In the perforated saws **all gumming is** avo ... and the teeth are easily kept long and in *proper shape*, saving *files*, *labor*, *expense* and *vexation* As is well known, our saws cut faster, smoother and easier than any other.

MOVABLE-TOOTHED CIRCULAR SAWS AND SOLID SAWS OF ALL KINDS.

Hankins' Elliptic Forked Saw Frame.

Patented June 28th, 1870.



The annexed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any centre bolt, secures for the Frame great strength and durability.

These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

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Dietrich's Patent Wood Saw. Guaranteed the strongest, lightest, easiest to strain or tighten and best braced wood saw made; also to give perfect satisfaction.

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J. Flint's Patent Plastering Trowels. The best made and finished Trowels in the world. We make four grades of Plastering Trowels, from the best to the cheapest.

Our patent method of grinding hand saws makes them superior to any in the market.

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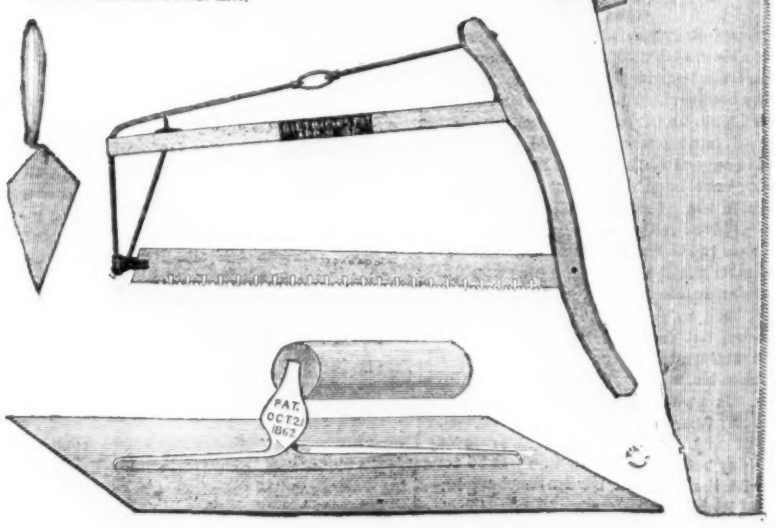

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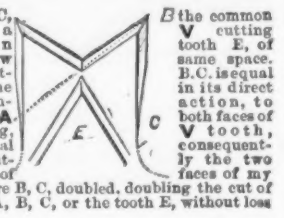
Our leading papers, such as the *Tribune*, *American Agriculturist*, *Christian Union*, etc., have published over sixty editorial notices recommending these Saws. Farmer's Clubs, Lumbermen, and Hardware Dealers unite in propounding the genuine Lightning Saw the greatest labor-saving implement of the age.

I have hundreds of letters from practical sawyers, voluntarily written, expressing their entire approval of these Saws.



A, B, C, represents a common drag saw tooth for cutting in one direction only, for [A wood sawing, and is equal to both cutting edges of **M** tooth are B, C, doubled, doubling the cut of the tooth A, B, C, or the tooth E, without loss of space. B the common V cutting tooth E, of same space. B.C. is equal in its direct action, to both faces of V tooth, consequently the two faces of my

This is produced by dressing the two points of my **M** tooth, to cut in line so that the outside B, C, has four times the space of the slant edge behind it, or from 1 to 5, while slant has space from 1 to 2, the inefficient slant edges are thus practically concealed and do but slight surface cutting, while B, C, edges cut and clear simultaneously.

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Sole Proprietor and Manufacturer.

N. Y. Saw Frame Co.

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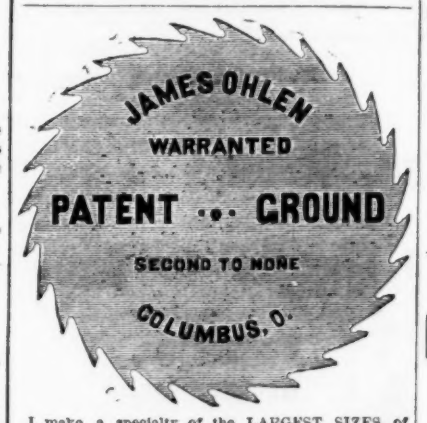
SOLE AGENT.



I make a specialty of the LARGEST SIZES of **Circular Saws,** and call particular attention of lumber manufacturers to the following points of excellence:

Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself, who has devoted over *twenty years* to the art of saw making.

I am sole proprietor and manufacturer of the celebrated "**Challenge**" **Cross-Cut Saw.** Price Lists of all kinds of saws sent on application.

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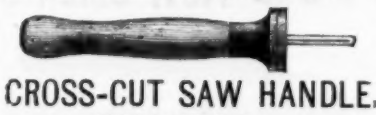

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B4*ANY

Narrow Gauge Railway Construction in the United States and Canada.

Prepared for the American Iron and Steel Association by W. W. NEVIN, Esq.

This brief paper will present an attempt to record and tabulate as succinctly as possible the actual work done in the construction of narrow gauge railways in the United States and Canada. These figures representing the field work of the narrow gauge men are the demonstration of fact, and are more effective than any discussion of questions of science or mechanics, just as the field work of an army is the best test of its strength. The tables, of course, are imperfect, because necessarily meagre and short of the full results. Were accurate reports to be had from each road, and perhaps others of which we have not even the names, all the tables would be increased.

This table presents a list of those roads which have already a portion of the line built and in operation, showing in the first column the mileage of track already laid or in operation, and in the second the mileage involved in the completion of roads already in partial operation:

NAME.	Miles built.	Total length.
Denver and Rio Grande	156	870
Cairo and St. Louis	92	150
Utah Northern	70	160
Kansas Central	65	560
Arkansas Central	64	150
Colorado Central (N. G. Division)	26	42
North and South of Georgia	35	130
Montrose	27	27
Ripley	26	36
At Johnston (Private)	25	25
Cherokee, Alabama	23	45
Iowa, Eastern	20	183
Milwaukee and Des Moines	20	300
American Fork, Utah	18	22
Pioche, Nevada	18	18
Central Valley	12	12
East Broadtop	10½	31
Mineral Range, Michigan	12½	100
Wasatch and Jordan Valley	12	16
Pittsburgh and Castle Shannon	8	8
Bell's Gap	8½	40
Peakskill Valley	7	7
Summit County, Utah	8½	30
Tuskegee	5½	30
Louisville, Herod's Creek and Westport	5	28
Plainsville and Youngstown	22	65
Baltimore, Swan Lake and Towsontown	6¼	6¼
Peachbottom	10	60
Bingham Canon and Salt Lake	20	20
Ceredo Mineral, W. Va.	12	20
Cheraw and Salisbury	11	80
Lawrence and Evergreen	5	5
Echo, and Coalville, Utah	9	9
Natchez, Jackson and Columbus	6	260
Galena and Southern Wisconsin	80	150
Rio Grande, Texas	23	..
Walla Walla, Oregon	10	30
Kaighn's Point, N. J.	5	12
Total	944	3737

The following roads expect to have completed during this winter additional mileage as follows:

Cairo and St. Louis	52
Des Moines and Minnesota	17
Parker's Landing and Karns City	10
Total	1023

All of these roads are in the United States, and, with one or two exceptions, of the exact 3 feet gauge, which in this country has been accepted as the standard narrow gauge. To these may be properly added the narrow gauge railways in active progress in the Canadas and other British possessions of North America:

Name.	Miles built.	Total length.
Toronto, Grey and Bruce	165	200
Toronto and Nipising	87	218
New Brunswick	70	170
Prince Edwards Island	80	253
Total	402	841

To sum up, there is a total mileage of narrow gauge railway built in this country of:

Name.	Miles built.	Total length.
United States Roads	1025	3749
Canada Roads	402	791
Total	1427	4540

There is in addition a short line in Mexico doing well.

In addition to these roads in actual operation there are a large number of others in progress of construction. Among those of which we have some immediate knowledge are the following:

Name.	Under construction.	Total length.
Northern Pacific Coast, partly graded	90	250
Florida, Memphis and Columbia	120	600
Lexington Lake and Gulf	170	170
Wyandotte, Kan. City and Northwestern	100	250
Cairo and Tennessee River (under construction in Duck R. V. Ala.)	75	100
South Branch (W. Va.)	26	51
Cheraw and Salisbury	15	80
Nashville and Vicksburg	26	470
Bainbridge, Cuthbert and Columbus	20	140
California Central	150	465
Des Moines and Sioux City	20	180
Salt Lake, Sevier Valley and Pioche	25	300
Alameda, Oakland and Piedmont	60	60
St. Louis and Manchester	8½	30
Juan, San Pete and Sevier	10	75
Washington, St. Louis and Cincinnati	65	950
Greenville and Paint Rock	5	22
Stockton and Ione (California)	36	36
St. Louis and Western	100	315
Vicksburg, Pensacola and Ship Island, working at both ends		180
St. Paul and Iowa Southwestern, grading commenced		
Iowa Eastern, all under contract		183
Lancaster and Reading	15	60

	Miles graded.
Denver and Rio Grande	50
Utah Northern	90
Arkansas Central	86
North and South of Georgia	60
Summit County (Utah)	3½
Peachbottom	45
Ceredo Mineral (West Virginia)	6
Natchez, Jackson and Columbus	14
Golden and South Platte	10
Kaighn's Point	7

To these lists might properly be added a large number of organized and chartered roads, most of which have been surveyed, but of which I have no direct information. A private directory shows over 130 of such roads whose projected mileage would foot up tens of thousands.

So much for the work on the ground—the evidence of faith in the system; now for the results, the justification. The returns of the first year's work must always be considered as but the imperfect promise of the yield that is to come, and, in the case of these infant narrow gauges, the first year can hardly yet be said to have been reached, as they are all in progress of construction. But to the figures, the test of investment.

From the several reports, so far as within our reach, we learn that for the year 1873 the Denver and Rio Grande shows net traffic earnings of 50 per cent. on the gross.

The Mineral Range (Michigan), just opened for 12½ miles, shows for the three months ending Dec. 31, 1873, the panic quarter, gross earnings of $19,422, of which $7695 were net, or within a slight fraction of 40 per cent.

The Toronto, Grey and Bruce, for the year ending June 30, 1873, reports net traffic earnings of 34 per cent. of its gross.

The Toronto and Nipising, for the year ending June 30, 1873, shows net traffic earnings of 39½ per cent. on the gross.

The Arkansas Central for their short line of 64 miles completed, for the six months ending July, 1873, shows net earnings at the rate of $2000 per mile per year, which is far more than the average of Southern railroads. These results of operation surely are a promise that amounts to evidence.

The results of construction, too, have been achieved, it must be steadily borne in mind, at a time when general railroad building had been severely checked; and the running expenses are those not of completed but of uncompleted roads in progress of active construction.

Finally, it is to be taken into consideration that not one of these narrow gauge roads, in the United States at least, is a land grant road, and a large proportion of them have been built in the far West, where nearly every road around them has been constructed by government aid. This surely settles the question of the power of the narrow gauge roads to sustain themselves on equal terms with their broad gauge competitors.

Speed on the English Railroads.

We have frequently referred to the greatly increased speed at which the principal express trains on our great iron highways are now being worked. It would seem, indeed, that the companies are actuated entirely by a desire to serve a small section of the traveling public who prefer traveling by fast trains, with all the greater risks to which, as experience has lately taught us, express trains traveling at a high speed are exposed. We were able to intimate as long ago as March last that the subject of the reduction of the speed, and also of the number, of the costly through express trains run to competing points had engaged the attention of the railway authorities, but nothing definite had resulted from the negotiations. A further meeting with the same object was, however, to take place; but it would appear now that whatever form the deliberations at the further meeting took, whether as regards the speed or a reduction of the number, nothing tending to bring about either object has been accomplished. As a principle it was laid down, and generally admitted, we believe, that a maximum limit of forty miles an hour was sufficiently high for the fastest express train. This, we also understand, is the highest speed asked for by the post office in the case of the principal mail trains. Being merely in the form of a recommendation, the principle of a forty mile maximum was not, of course, binding, and none of the companies having taken the initiative as regards the competitive trains, the others could not follow, and things stand precisely as before.

It cannot be that the companies are maintaining these high speeds for the advantage of the traffic, for if the traveling public preferred the fast to the slow trains, still, if there were no fast trains, the number traveling would not be likely to diminish. Again, express trains are fearfully expensive to run, for, assuming there is no greater risk attached to them than to slow trains, they incur additional expense not only by their requiring a very superior class of rolling stock, but a permanent way of a corresponding degree of excellence. At the same time they materially interfere with the working of the slower traffic, which has to put up with all sorts of detensions in order that it may be kept safely out of the way of the fast trains. Neither can it be safely alleged that the public have encouraged particular companies to accelerate particular competitive trains, for if one company puts on a fast train to a point where another company is in competition, the public will soon find that they can go by either line in just the same time, for the other company is never slow to retaliate by putting on an equally fast train. And where one company has a longer route to traverse than the other, it is quite easy to see, under these circumstances, how the issue of the competition may become really dangerous, and in a corresponding degree detrimental to the interests of the shareholders.

With the view of showing how the companies are acting under the influence of the insane spirit of competition that exists, it is well worth while to go through the time books of a few of the principal companies having termini in London and converging at competing points elsewhere. It is quite obvious that where there is no competition there is a minimum of speed, and the highest speeds are to be found where a company has a longer or more indirect route to any important point than the other competing companies. We find also that the limit of speed which was recommended at the meeting, already referred to, is enormously exceeded on the majority of the lines. At the same time, and with the report of Captain Tyler on the late Wigan accident before us, a state of things exists elsewhere, which, in the mildest terms, can only be stated as alarming. On referring to the company's time book, we find that on the section of the London and Northwestern line where this accident occurred—between Warrington and Preston—the speed of the train to which the accident happened, for the entire run over that portion of the line, without stopping, is only 38½ miles an hour. This is comparatively moderate for an express train. The same train travels over the section of line preceding that where the accident occurred—from Crewe to Warrington—a length of 24 miles, in 34 minutes, or at the rate of 42½ miles an hour. If we compare this speed, too, with what we find on other parts of the company's system, we find it is regularly exceeded, and even at places where the other traffic is heavier and the lines consequently more blocked than at Wigan. For instance, the 7:15 Irish morning mail runs from Euston to Rugby in one hour and fifty-five minutes, the distance being 82½ miles, and at the average speed, therefore, of forty-three miles an hour. The Scottish morning express also travels on the same line from Rugby to Crewe at a speed exceeding forty-five miles an hour. The London & Northwestern is, however, well situated as regards direct access to the various competitive points it reaches, and it is not with them, therefore, that we must look for the highest speeds. Of all of the three great northern lines the London & Northwestern are manifestly the slowest. The Midland Company advertise to run their morning express, starting from St. Pancras at ten o'clock, from Kentishtown to Bedford, in sixty-two minutes, the distance being 48¼ miles, and showing an average rate, therefore, of 46¾ miles an hour. Taking into account the excellent position which the Midland company holds as regards direct access to the more important competing points, it seems absurd that they should maintain so high a speed, except with the object of shutting out, at any cost, rival lines less advantageously situated. It is on the Great Northern line, however, that we find the issue of the competition that has for some time existed, and the consequent acceleration of the trains, culminating in a truly marvelous speed. This company now runs both its morning and evening Scotch express trains from London to Petersborough, a distance of 76¼ miles, in an hour and a half, being at the average rate for the distance of 50¾ miles per hour, or something like 12 miles an hour faster than the London & Northwestern tourist train had to average on the Wigan stage of its journey. The Great Northern Company, it must be remembered, are rather unfortunately situated with regard to access to Liverpool, Manchester and Glasgow, and are in consequence compelled to greatly expedite their trains in order to hold their own in point of time and in business with the rival companies.

But even this apparently excessive speed of the Great Northern Company is eclipsed elsewhere, for we find the Great Western Company, in order to hold their own against the London & Southwestern Company, who have a shorter route by 23 miles to Exeter, are compelled to run a train starting from Paddington at 11·45, arriving at the first stage—Swindon—a 1·12, the time occupied in doing the distance of 77½ miles being just 87 minutes. This is at the rate of 53¼ miles an hour, and is probably the fastest train in the world. It is only, of course, at Exeter and the places beyond that this train is competitive with the corresponding London & Southwestern train, which occupies the same time on the journey. To all these places the companies have agreed, and do charge, the same fares by both routes; and it is not too much to say that they might, with great advantage to themselves, mutually agree that the time to be occupied in the journey should be increased. So long as both trains occupy the same time on the way, however much the speed may be reduced, the proportion of the traffic traveling by either would not be affected. The Southern companies, notwithstanding that they have numerous traffic agreements and other joint working arrangements, show that in point of speed it is much more difficult to come to an understanding. The Brighton Company, not to put down opposition (unless it be from fear of projected schemes of new lines), but simply to encourage and cultivate a special kind of traffic, run a train from London bridge to Brighton in sixty-five minutes, the distance being 50½ miles, and the speed 46¾ miles an hour. The Continental express trains of the Southeastern and London, Chatham & Dover companies travel at an average speed throughout the journey of 44¾ and 46¾ miles per hour, respectively.

The following shows, in their order, the maximum average speed of the express trains on the different lines referred to in this article:

Great Western	53½ miles an hour.
Great Northern	50¾ " "
Midland	46¾ " "
London & Brighton	46¾ " "
London, Chatham & Dover	46¾ " "
London & Northwestern	45 " "
Southeastern	44¾ " "
London & Southwestern	43¾ " "

But surely when the companies can, as they are now doing, harmoniously agree in their rate and fares between all competitive points, whereby neither is calculated to secure an undue advantage over the other, it should be none the less difficult to agree to the time in which the journey is to be performed. The accommodation now provided for the traveling public in this country is certainly such as cannot be equaled elsewhere, but there must be a point at which the keenness of the competition which has, in the main, given rise to this superior care for the public interests, should in the interests of the shareholders, be moderated. The companies can run slower trains if they like, and still continue to give satisfaction to the public. By doing so they would also add materially to the general profit arising from working the lines.—*London Railway News.*

The oldest stove, probably, in the United States, is that which is still in use at the Capitol in Richmond, Va. It was made in England in 1770, and was 60 years in the House of Burgesses in Virginia before it was removed to the Capitol, where it has been for 30 years.

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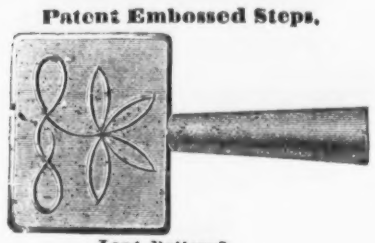
Patent Embossed Steps.



Leaf Pattern.

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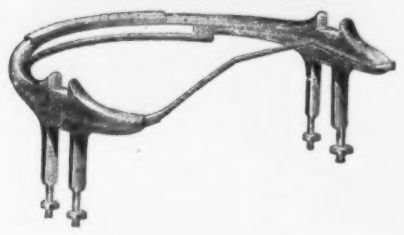
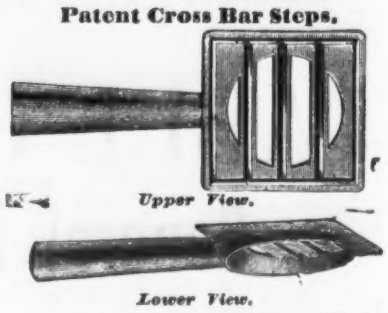


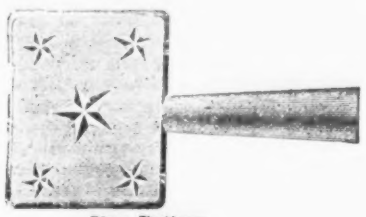
1871 Pattern Shaft Couplings.

Patent Cross Bar Steps.



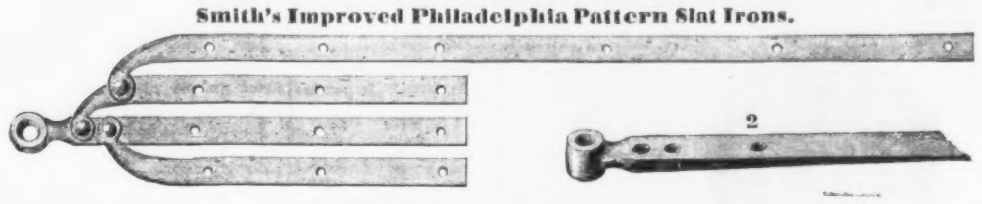
Upper View.

Lower View.

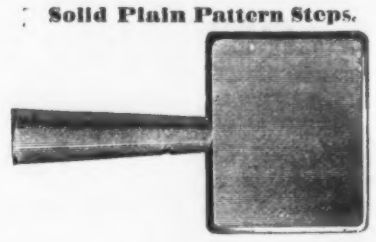


Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.



Solid Plain Pattern Steps.



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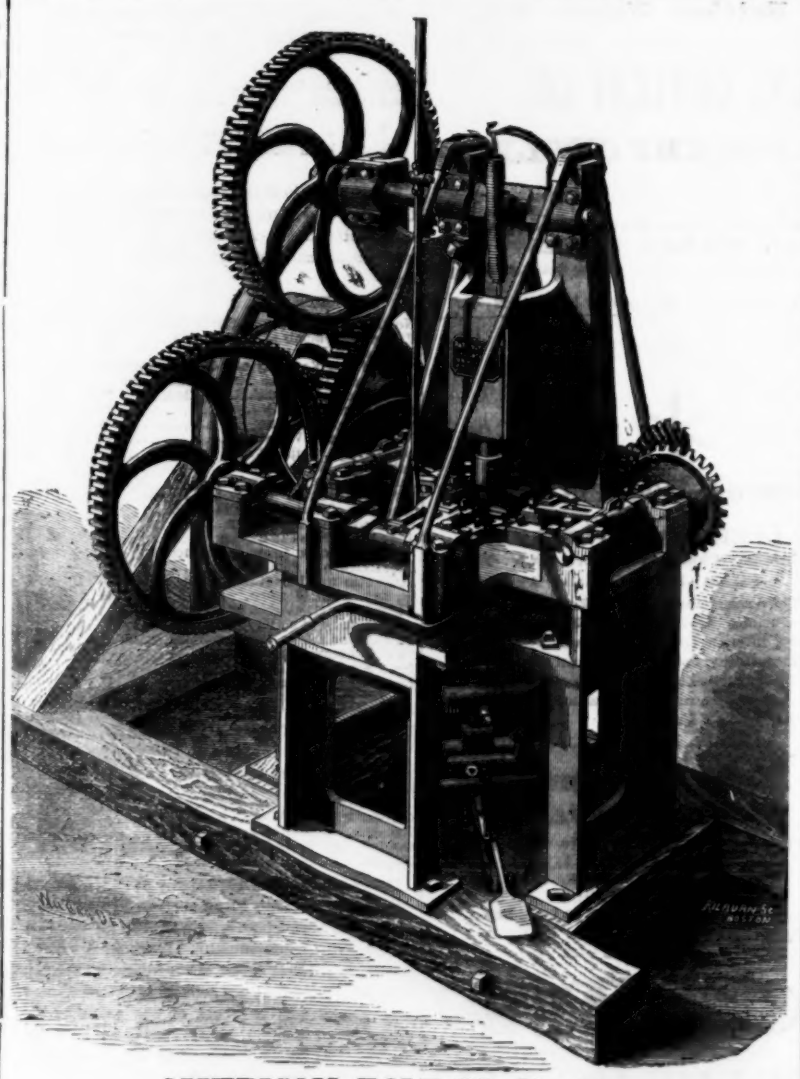

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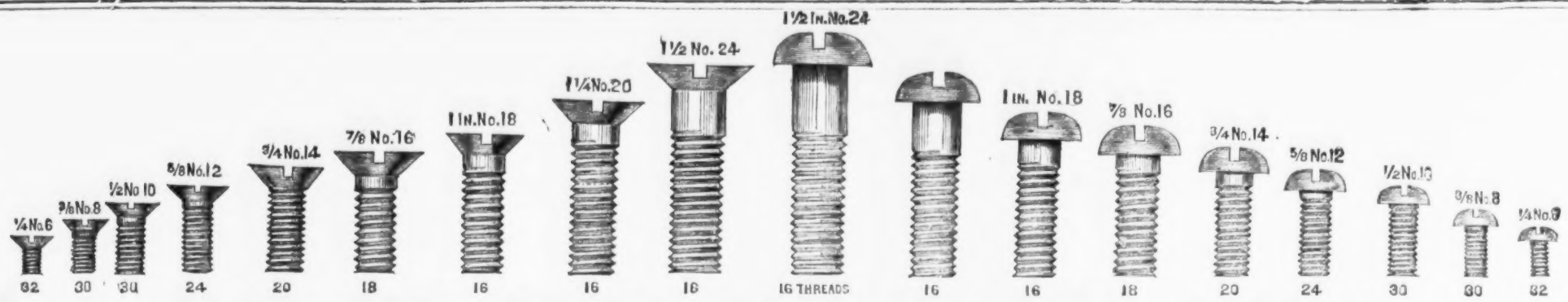

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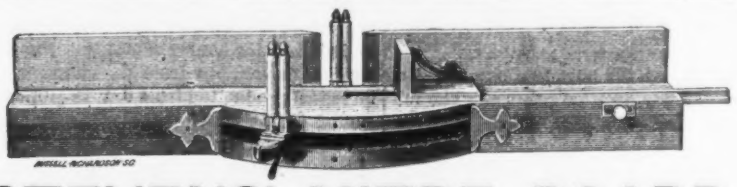

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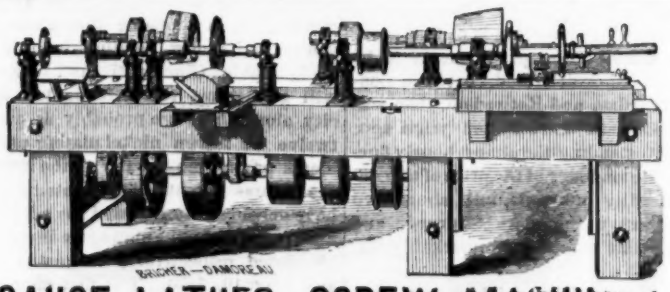

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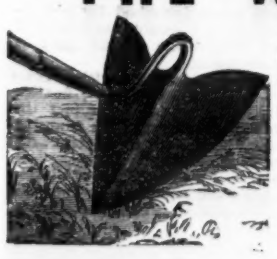

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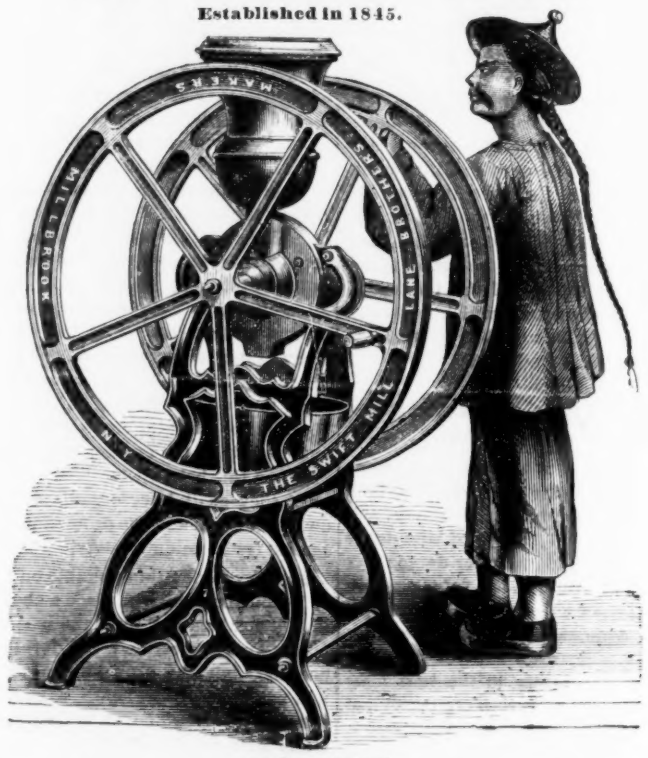

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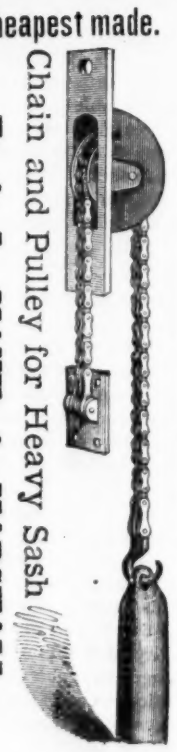

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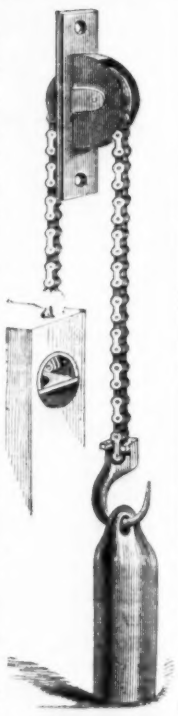

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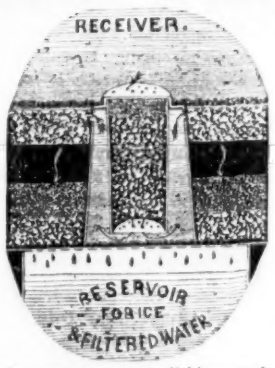

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The Iron Age.

New York, Thursday, March 5, 1874.

DAVID WILLIAMS . . . Publisher and Proprietor.
JAMES C. BAYLES . . . . Editor.
JOHN S. KING . . . . Business Manager.

The Iron Age is published every Thursday morning, at No. 10 Warren Street, New York, on the following terms:

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One square (12 lines, one inch), one insertion, $2 50; one month, $7·50; three months, $15·00; six months $25·00; one year, $40·00; payable in advance.
All communications should be addressed to

DAVID WILLIAMS, Publisher,
10 Warren St., New York.

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The Centennial.

On another page of this issue we publish the special message of President Grant, issued under date of February 25, but received too late for publication in our last issue. It accompanies the annual report of the Centennial Commission, and is intended to add a word in the way of recommendation. We cannot say that the document commands our unqualified admiration, either as a literary composition or a State paper, but it brings the subject of the Centennial fairly to the notice of Congress, with the executive approval. The only part of the message to which we take especial exception is the concluding sentence, which reads as follows: "Let us "have a complete success of our Centen- "nial Exposition or suppress it in its in- "fancy, acknowledging our inability to "give it the international character to "which our self-esteem aspires." We fail to see that Congress is in a position to choose between the alternatives offered by the President. The time for suppressing the Centennial "in its infancy" has passed. By act of Congress and executive proclamation the faith of the nation has been so far pledged to make it an International Exposition that six foreign governments have formally signified their intention to participate, and two others have informally indicated that they would do so in good time. To allow the movement to fail now for want of assistance from the national government would be more than a wounding of our "self-esteem." It would be a national disgrace. What would be our position before the world if we were compelled to say to the governments which have promised co-operation that we are very sorry, but we find that the undertaking is altogether too costly, and that we cannot afford to celebrate our national anniversary in 1876 by any such exposition as we thought of having before we knew how much it would cost? It is no longer "self-esteem," but self-respect, which prompts the desire of patriotic citizens for the fulfillment of our promise to hold a grand international industrial exposition in 1876, and to talk at this time of smothering it in its infancy is to talk nonsense. Two years ago Congress could have chosen between the alternatives offered; now the alternatives are a successful international exhibition or national humiliation and disgrace.

It is certainly to be regretted that the Centennial Commissioners have had to ask Congress for an appropriation. When the plan was proposed, it was believed that the people of the United States would subscribe the money needed to carry it out. Had there been no panic it is not improbable that the plan would have in some measure succeeded, and that enough money would have been raised this year to carry the work forward without delay. Next year subscriptions would have been easier obtained, and had a good start been made, Congress would probably have had but little to do beyond giving the Commissioners "moral support" in their work. But the panic came, and with its coming the hopes of those who relied upon the patriotism and liberality of the people were dashed. But there was no time to lose. The Commissioners could not wait another year to raise the money needed as a basis for building contracts, and when the inevitable appeal was made to Congress for aid, the people buttoned up their pockets. If Congress comes to the aid of the Commissioners the people will help it through: if not, the Commissioners might as well resign and go home, for the people will do nothing. This, we believe, is a plain statement of the situation of affairs. The fate of the Centennial rests with Congress, and with Congress alone. Those to whom the work of organization has been committed have accomplished all in their power, and what has been done has been well done. Local jealousies are strong, sectional animosities bitter—these hostile feelings cannot fail to influence Congress in some degree: but we believe that the Senate and House will concur with the president, and that an appropriation will be made which will insure the success of the Centennial and set at rest any doubts which now exist as to whether 1876 is to bring us national honor or national humiliation.

Protection for Capital and Labor Against Trade Union Tyranny.

We believe the time has come when some action on the part of employers in the iron trades is needed to protect both labor and capital from the tyranny of the trade unions, and to decide whether the masters or the men shall manage our furnaces, rolling mills, foundries and machine shops. Many will agree with us; some, perhaps, will not; but it is with a full sense of our duty and responsibility to the trades we represent, that we warn the iron masters of the danger of allowing the trade unions to feel that capital is either unable or unwilling to organize for its own protection and the protection of labor against injustice and oppression.

We have not space, nor is it necessary at this time, to argue the question of whether trade unions are right or wrong in principle. Practically, they have benefited labor by securing it a larger and more equitable share of the profits of production. In theory, the fairest and most satisfactory relation which could exist between capital and labor is one which recognizes an absolute freedom of contract between master and man. The highly skilled and industrious mechanic is worth more than the mechanic of average skill, and his superior qualifications should command him higher wages. In practice, however, such distinctions cannot well be recognized. In large establishments it is impossible to grade each man according to his individual merits and the value of his services. Workmen must be regarded collectively, and it is in securing better wages for workmen as a class, and a fuller recognition of the rights of labor, that the trade unions have been of benefit. We believe that labor is entitled to as large a share of the profits of production as it can command, and the maintenance of the unions is the surest way of enabling labor to treat with capital upon terms of equality. High wages have contributed more than anything else to the rapid growth of our population and the rapid development of our resources during the past half century, and until we can afford to dispense with immigration we cannot afford to cheapen production at the expense of the working classes by cutting wages down. High wages are bringing to our shores the skilled artisans and strong, ambitious young men and women of other countries, to build up our industries and settle our western prairies, to build our railroads, open our mines, and assist in countless ways in carrying on our great productive and distributive industries. High wages have brought us incalculable benefits in an increased and cheapened production, and so far as the unions are instrumental in maintaining high wages, so far they are useful and beneficial to all classes of the community. But it is against the measures adopted by the unions to control both workingmen and employers, to dictate who shall be employed and who discharged, to declare strikes and force men willing to work to stand idle, to compel men to contribute to the support of others standing idle without cause—in short, against the tyranny of the trade unions, that active measures of defense are necessary. Capital must protect itself, or it will be driven out of manufacturing into other and safer investments.

In expressing this opinion, we do not think we exaggerate in any respect the danger which now menaces the iron trade. In many parts of the country, especially where furnaces and rolling mills are numerous, labor already controls capital. The unions are not satisfied with the highest wages paid anywhere; they want to dictate the terms upon which the masters shall be allowed to carry on their business, and they do it. From the headquarters of their unions they send anonymous letters to the masters, threatening strikes if their orders are not complied with. Sometimes in the midst of operations an order comes to quit work, and the men obey—throwing down their tools and leaving the masters to shift as best they can. In such emergencies the masters can have recourse to the costly expedient of blowing out their furnaces or closing their mills until the strikers come back and ask for employment, but the men who are willing to work, and who are deprived of employment because a few noisy demagogues of the unions want a strike, are even worse off than the masters. If they continue to work, it is in constant danger of bodily harm, and with the knowledge that they are inviting the enmity of the unions. They do not know at what moment they may be cut off from employment because of the inability or unwillingness of their employers to protect them against the unions. We know of districts in which a majority of the workmen, trusting their employers more than they do their fellow workmen, would gladly repudiate all connection with, or allegiance to, the unions if they dare, but they dare not. They cannot afford to invite the enmity of the men who control these organizations, for if they do the chances are against their obtaining or retaining employment. Without the help of the masters they are powerless, and this help the masters cannot give until they shall have organized for their own protection and the protection of labor against trade union tyranny.

Is such co-operation possible on the part of employers, as will place a check upon the further exercise by the unions of their power for oppression? We think it is possible, but the probabilities are that it will not be resorted to until, as in England, it becomes an imperative necessity. Capital is notoriously selfish. If an employer can profit by running his furnace, or mill, or foundry, or factory when his neighbors are contending with strikes, he is very apt to do it. Labor makes sacrifices to accomplish its object. If the workmen of one section are on strike, the workmen of other sections contribute to their support; if the employers of one section are holding out against a strike, the employers of other sections are apt to take all the advantage they can of the lessened competition. Only those who are in trouble themselves want to co-operate for mutual protection; when their trouble is over their neighbors may take care of themselves. The shrewd managers of the trade unions are not blind to this fact. They know that, with organization, they can compel the masters, who have no organization, to yield to their demands, and in this knowledge lies their great power

It has been suggested that the iron masters of the country form associations on the basis of an agreement not to employ any man in their works who cannot show a discharge from his last employer. Under proper conditions, this expedient would be productive of immediate and permanent benefit to both labor and capital. No employer should be countenanced in withholding a certificate of discharge from any man without sufficient cause, and any man who has "served out his notice," if such notice be agreed upon, should be entitled to his papers. On the other hand, no man quitting work without just cause and to the injury of his employer, and no man discharged for good cause, unless because his services were no longer needed, would have reason to complain if he should find difficulty in getting employment elsewhere. We do not know that this would be the best plan, but the suggestion comes to us from an iron master of high standing, who is known to be a generous and considerate employer, and it certainly merits attention. We shall have more to say on this subject in a future issue.

The Duty on Steel.

We have received a letter from one of the principal steel importing houses in this city, asking us to correct a wrong impression which the article in our last issue, discussing the subject of the steel duties, might leave on the mind of the reader. We said:

> If, on the other hand, the various grades of steel were made to pay specific duties at so much per pound, according to quality, the importers would be subjected to very much greater inconvenience than they now suffer, and the customs officials would be compelled to adopt very much more stringent measures than are now necessary to prevent frauds on the revenue. * * * Steels can only be graded in one way, and that is according to value, and, whether the duty be high or low, we see no way of assessing it fairly and equitably except *ad valorem*.

To this our correspondent replies:

> A reference to the tariff now in force will satisfy you that the various grades of steel are made to pay "specific duties at so much per pound, according to quality," and the justness of your condemnation of this mode is vindicated by our own experience, and by the experience, we presume, of the other importers in this city: that is to say, we are subjected to very great inconvenience, and the officials do adopt what we think you would consider "stringent" measures. Believing that you have no desire to misrepresent any part of this subject, which is, at present, causing some discussion, we ask you to correct the impression that the present steel duties are simply *ad valorem*; an impression which your article is likely to give.
>
> It is true the duty on steel partly manufactured is simply *ad valorem*, and there is an *ad valorem* rate of ten per cent. on the highest grade, but this is in addition to the specific rate: and it is still true that the steel duties are practically specific at so much per pound according to quality, a mode of assessment which experience has shown to be inconvenient and annoying, and which you justly condemn.

Under the tariff now in force, steel is required to pay duty *ad valorem*. The following is the tariff:

Steel in bars, ingots, sheets and coils, value 7c. or less per lb.....2¼c. per lb. less 10 per cent.
Steel in bars, ingots, sheets and coils, valuation 7c. and not over 11c. per lb.....3c. per lb. less 10 per cent.
Steel in bars, ingots, sheets and coils, value over 11c. per lb.....3½c. per lb., and 10 per cent. less 10 per cent.

This is, in principle and in fact, an *ad valorem* tariff, for the various grades of steel are required to pay duty according to value. After the value has been ascertained, the steel is required to pay a specific duty per pound, but this specific duty is graded *ad valorem*.

There seems to be no question of fact at issue, unless it be as to the proper definition of the term *ad valorem*, which we understand to mean according to value. If we are right in thus defining it, we fail to see how a duty assessed according to value, can be other than an *ad valorem* duty. To dispute the facts stated by our correspondent would be merely to quibble over words; but as we had no intention of misrepresenting any part of the subject, we give the rates of duty and our reasons for considering them *ad valorem*, and not specific in the sense in which that term is used in connection with tariff imposts.

The European Tin Markets.

Until within the past eight or ten years, the prudent capitalists of Holland have considered tin the safest of all commodities in which to invest money, and the large stocks which have been bought up and held for long periods in the Dutch market, have enabled the Holland dealers to control the trade. The price fluctuated but little. The capacity of production on the Malacca Peninsula and the island of Banca was well known; the supply was as certain as the demand was even and regular, and the Dutch Trading Company steadily pursued its old policy of steadying values by always retaining a considerable stock in reserve. Since the extension of the telegraph, however, the trade in tin has become largely speculative. Foreign dealers now buy and sell "futures," and thousands of tons more tin is now selling on paper, never to be either received or delivered, between London, Amsterdam and Rotterdam, than was sold on forward delivery ten years ago. But notwithstanding the almost hourly fluctuations, the tendency of the price of tin continued steadily upward until about two years ago, when the market turned, and since that time it has been remarkably unsteady.

As tin is an article which we are compelled to import in considerable quantities annually, much interest is now felt in this market as to the immediate future of prices. In our translations and condensations of European and East Indian market reports, we have kept our readers informed of the foreign movements in tin, and the causes immediately instrumental in producing recent fluctuations, chief among which is the increased production in Australia, while Malacca and Banca have kept up a steady supply. To this must now be added the effect of the announcement that tin mines on the west coast of Malacca, said to be of great extent and value, are to be opened, arrangements to that end having been completed with the natives. Another and more immediate cause of the decline in prices is a great tin failure in England, of which mention is made in our Paris report, and which, with the dullness incident to the elections, explains the decline in tin at London to £105, during the latter part of February; but March opened with a drop more sudden and marked than is recorded in the history of the tin trade for many years, for, as the cable informs us, the London market has fallen to £97, and Amsterdam to 87 guilders per ton. We must await the arrival of mail advices before venturing to discuss the causes of this remarkable decline, which is possibly only the result of a speculative movement, such as we have frequently witnessed of late in the European tin markets.

During the past nine years the average prices of Banca tin in Holland has been as follows:

	Per 50 kilos.
1865	56 guilders.
1866	46 "
1867	54 "
1868	54½ "
1869	82½ "
1870	75¾ "
1871	75 "
1872	92¼ "
1873	85 "

During these great fluctuations in values the Dutch Trading Company sold as follows:

	Slabs.
1865	169,927
1866	221,746
1867	141,075
1868	102,687
1869	111,080
1870	158,558
1871	166,239
1872	104,723
1873	135,211

It will thus be seen that the sales during the past two years have not been especially large. Hitherto the statistical position of tin in Holland has been the criterion by which to judge of the course of prices in the immediate future; but from the moment an increased production from sources not controlled by the Dutch Trading Company is felt in the market, we shall be, for a time, at least, without data upon which to base calculations. The last statistics of the month make the following showing:

JANUARY, 1874.

	1874.	1873.
Banca.	slabs.	slabs.
January deliveries	6,238	6,301
Present stock on Warrants	34,225	28,251
Present unsold stock	105,548	83,473
Afloat	5,400	23,170
Billiton.		
January deliveries	....	1,500
Present stock on Warrants	100	431
Present unsold stock	3,007	....
Present private stock	24,053	7,227

It will be seen that there is nothing startling in the Banca statistics, but that the stock of Billiton in private hands was large.

The Adams Nickel Plating Patents.

In our issue of last week we published a decision of much interest, rendered by Judge Shepley, in the U. S. Circuit Court, of Massachusetts, but owing to the crowded state of our columns we were compelled to reserve our comments until this issue. The decision to which we allude was rendered in the case of the United Nickel Company *agt.* N. S. Kieth, in which the plaintiffs sued for an injunction to restrain the defendant from further using the process of nickel plating claimed in the patents issued to Dr. Isaac Adams, without the consent of the company owning those patents. The defence rested on the ground that there was no infringement, as Dr. Adams' patents were invalid, for the reason that he neither originated nor invented the process covered by the claims allowed by the Patent Office. After a careful review of the testimony, and an examination of the law and of previous decisions of the courts in similar cases, Judge Shepley reached the conclusion that the fact of infringement had been established, and an injunction was accordingly granted restraining Keith from using the process without the consent of the patentee.

The importance of this decision is very great. The case in question is a test case, and unless the decision of Judge Shepley is reversed, it is probable that a number of similar suits now pending in this city, Philadelphia, Cincinnati and elsewhere, will go against the defendants. In this city alone there are probably as many as twelve or fifteen nickel plating establishments paying no royalty to the owners of the Adams patents. These patents, which have considerably retarded the adoption of nickel plating by the plating trade generally, are dated respectively, August 3, 1869, and May 10, 1870. The first claims:

1. The electro-deposition of nickel by means of a solution of the double sulphate of nickel and ammonia, or a solution of the double chloride of nickel and ammonium, prepared and used in such a manner as to be free from the presence of potash, soda, alumina, lime or nitric acid, or from any acid or alkaline reaction.
2. The use for the anode of a depositing cell of nickel, combined with iron, to prevent the copper and arsenic which may be present from being deposited with the nickel or from injuring the solution.
3. The methods herein described for preparing the solution of the double sulphate of nickel and ammonia, and the double chloride of nickel and ammonium.
4. The electro-plating of metals with a coating of compact, coherent, tenacious, flexible nickel, of sufficient thickness to protect the metal upon which the deposit is made from the action of corrosive agents with which the article may be brought in contact.
5. The deposition of electro-plates of nickel, to be removed from the surface on which the deposit is made, and used separately therefrom.

The second claims:

1. The combination with nickel to be used

for anodes, of a metal, or metalloid, electro-negative to the nickel in the solution displayed.

2. A nickel anode, combined with carbon and cast in the required form.

As the interests involved are very considerable, it is not improbable that the question of the validity of Dr. Adams' patents will ultimately be carried to the United States Supreme Court, but from present appearances we conclude that they will bear investigation better than was supposed by those who have considered it safe to infringe them. In the case of the United Nickel Company *agt.* Kieth, an effort was made to show that the patentee had no claim to the invention, but without success, for, as Judge Shepley says: "with all the "research and investigation which has "been so lavishly bestowed upon this case, "the respondents have signally failed to "show that electro-plating with nickel had "any practical existence as accessible or "beneficial to the public before the date of "thei nventions of Doctor Adams." We doubt if any new testimony can now be adduced which will present the case in a different light before a higher court, should appeal be taken.

THE CENTENNIAL.

MESSAGE OF THE PRESIDENT.

The President, on Wednesday of last week, sent the following message to Congress:

To the Senate and House of Representatives:

I have the honor herewith to submit the report of the Centennial Commissioners, and to add a word in the way of recommendation.

There have now been international expositions held by three of the great powers of Europe. It seems fitting that the one hundredth anniversary of independence should be marked by an event that will display to the world the growth and progress of a nation devoted to freedom and to the pursuit of fame, fortune, and honors by the lowest citizen as well as the highest. A failure in this enterprise would be deplorable. Success can be assured by arousing public opinion to the importance of the occasion. To secure this end, in my judgment, Congressional legislation is necessary to make the exposition both national and international. The benefits to be derived from a successful international exposition are manifold. It will necessarily be accompanied by expenses beyond the receipts from the exposition itself, but they will be compensated for many fold by the commingling of people from all sections of our own country, by bringing together the people of different nationalities, by bringing into juxtaposition for ready examination our own and foreign skill and progress in manufactures, agriculture, art, science and civilization.

The selection of the site for the Exposition seems to be appropriate, from the fact that 100 years before the date fixed for the Exposition the Declaration of Independence, which launched us in the galaxy of nations as an independent people, emanated from the same spot. We have much in our varied climate, soil, mineral products, and skill of which advantage can be taken by other nationalities to their profit. In return, they will bring to our shores works of their skill, and familiarize our people with them, to the mutual advantage of all parties. Let us have complete success of our centennial exposition, or suppress it in its infancy, acknowledging our inability to give it the international character to which our self-esteem aspires.

U. S. GRANT.

EXECUTIVE MANSION, Feb. 25, 1874.

ABSTRACT OF THE ANNUAL REPORT OF THE CENTENNIAL COMMISSION.

The accounts of recent exhibitions illustrate a most important and significant principle, which experience in universal expositions has more and more fully developed and established with each succeeding one; that the benefits of such exhibitions to the country giving them, and to the cause of general progress, are such as to justify and require an appropriation on the part of the government, which is responsible to other powers for the success of such an undertaking, and it is impossible to imagine how a power within whose boundaries such a concourse of industries and people takes place can evade the responsibility.

The report of the Centennial Commissioners, which the President transmitted with his message, contained the following among other information, and suggestions referring to the extent to which the international character of the exhibition had been accepted by the governments and people of other countries. This national undertaking has now reached that phase at which, in an international sense, if is to be decided whether the United States, as a republican nation, will fulfill that responsibility. They have already, so far as relates to foreign governments, assumed it, and the Commission, acting as the agent of the States, does not know how to retrace the steps which have been taken without discredit and injury to the national reputation. They have already pledged themselves to compete with other governments in promoting, through international exhibitions, the cause of human advancement in the arts and industries that are the foundation of the wealth and prosperity of all nations.

In the case of the Paris Exposition in 1867, the national government of France, in the city of Paris, provided about three-fifths of the capital for the purposes of the Exhibition, and the balance was made up by private subscriptions. The financial basis of the Austrian International Exhibition of 1873 was as follows: First, the sum of one million five hundred thousand dollars was subscribed, chiefly by the trades unions of Vienna; second, the imperial government unreservedly appropriated four and a half millions of dollars, and added to this a loan, without interest, of one and a half millions, making six millions derived from the government for the purpose of the Exposition. From the facts thus presented it appears that European governments exhibit their practical sympathy in the cause of labor and science by a recognition of their just claims upon the public treasury for a sufficient amount of pecuniary aid to insure the success of these temporary expositions. It is respectfully submitted that the government of the United States, if true to its principles and its traditional devotion to the interests and elevation of labor and the promotion of universal progress, will certainly not refuse to follow those precedents established by European governments. Past international exhibitions have been to some extent experimental, but the common judgment of civilized nations proclaims their success in advancing every branch of industry, science and national development; in diffusing throughout the world the most advanced ideas, knowledge of the latest improvements in manufactures and mechanical inventions, in methods and processes as well as in products, and also in promoting social and commercial intercourse between the people of the various countries.

European governments, perceiving the benefits specially accruing to the nation in which such exhibitions are held, have emulated each other in their efforts to secure the privilege of holding them. The reports received through several channels concerning the action of foreign governments in regard to the President's recommendation to them of the Exhibition, are such as to encourage the belief that if the President had been authorized to give a more direct and explicit invitation, the acceptances would have been more general and prompt.

The Secretary of State has informed the Commission that the governments of the following countries have officially communicated their decision to participate in the Exhibition, viz: The German Empire, The Netherlands, Belgium, Mexico, Ecuador and Hayti.

The Secretary of State has made known the gratifying fact that Prince Bismark, the Chancellor of that Empire, in communicating printed copies of the communication of this government on the subject to the German Parliament, recommended a participation in the Exhibition and provision for the appointment of a commission for each State of the Empire, as well as a plenipotentiary, to reside at Philadelphia until the close of the Exhibition. The Republic of Ecuador has not only accepted, but has already appointed a commissioner resident, who has presented his credentials at Philadelphia. A dispatch received from the Hon. George P. Marsh, through the Department of State, gives reason for the belief that the Kingdom of Italy will add to the attractions of the Exhibition by a display of specimens of the treasures of art and manufactures for which that Kingdom is so justly celebrated.

From dispatches received from the United States Minister at Vienna, the confident belief is entertained that the Austro-Hungarian empire will be conspicuously represented in our exhibition by the extent, variety and excellence of her products. It should be remembered that the proposed exhibition is, by act of Congress authorizing it, invested with the character of a national celebration of the Centennary of American Independence, and by the same authority has been so proclaimed and so commended to foreign nations by the President of the United States, and that the maximum amount of capital to be raised was fixed at $10,000,000. It should be considered, too, that the cost of labor and of material is greater in the United States than in Europe. It is submitted, therefore, that the amount to be appropriated by Congress should be proportioned with reference to these facts, and with reference, also, to the degree of aid which experience has shown to be requisite from the governments under whose auspices the latest and most extensive of such exhibitions have been held. It is the desire of the Commission that whatever appropriation is made should be guarded by such wise provisions and administered under such governmental control as will insure its judicious expenditure for the purposes intended.

The recent almost unprecedented depression in manufactures, trade and finance has interfered with the progress of subscriptions to the stock of the Centennial Board of Finance, and with the payment of instalments due on those already made. This state of affairs affords another imperative reason for such action by Congress as will provide sufficient and timely appropriations, to guarantee the success of the national undertaking. Pennsylvania stands pledged by an act of her Legislature for one million of dollars, and the city of Philadelphia for a half million, to be expended upon a building to be used by the Commission as a gallery of fine arts, which building will be a very imposing and beautiful addition to the group, and will remain as a perpetual memorial of the occasion. A copy of the plans of this building is annexed hereto. The people of Pennsylvania, in addition to these State and municipal appropriations, have subscribed to the stock of the Centennial Board of Finance about one and a half millions of dollars, which will go into the general fund for the expenses of the work of the Commission as it progresses.

This provision for about three times the quota apportioned to the State may be regarded as fully counterbalancing any peculiar advantage to the State growing out of the location of the Exhibition, and is as much as could be justly claimed from her in view of the national character of the celebration, of which the Exhibition is the chief demonstrative element. Notwithstanding that opportunities have been given in all the States and Territories by general advertisement, the agency of national banks, and in other ways, the amount of actual subscriptions to date from such States and Territories indicates that from this source the means could not be secured in time for use in prosecuting the work, if at all. The Comission has information that preparations are in progress throughout the country to make the most creditable exhibit of the products and industries of the nation, and that this feature of the Exhibition is assured beyond any doubt; but as the enterprise is regarded as a national one there is an unwillingness to contribute money for the preparation and installation of the Exhibition, which it is regarded as specially incumbent on the national government to provide for. While many of the States of the Union are not in a financial condition to contribute money for this purpose, the citizens thereof express the warmest sympathy in the success of the enterprise, and will give it their cordial support so far as it is in their power. Steps have been taken to secure a proper representation of the products of every State and Territory. To secure the complete and satisfactory success of the Exhibition in every department, it is absolutely necessary that such appropriations be promptly made by the national government as will enable this Commission to work with those advantages of governmental support that have been enjoyed by the managers of the recent international exhibitions in Europe.

The report enumerates the various interests that have already indicated a desire for and intention of full representation. It states that the benefits which the American people will derive from the Exhibition are by no means confined to the exhibition of American resources and products of art and industry. The arts of design will be represented in a manner never before possible on this continent. The products of the mechanic arts and manufactures of Europe and the Eastern nations will undoubtedly be represented on a grand and comprehensive scale, and not alone the products, but descriptions or illustrations of the methods and processes of their production will be given. Thus will be afforded to the millions of mechanics and artists, and to the pupils of technical and industrial schools who may be unable to visit foreign countries, an opportunity to examine and study all that is most valuable and instructive in the foreign arts and industries. Europe will come to them with its machinery and wares so arranged and classified, that they can view them as a whole, or study them in detail, and utilize their teachings.

The report of Director General Goshorn enumerates the work which has been done, and transmits copies of the plans, etc. He says in conclusion:

"To secure the complete and satisfactory success of the Exhibition in every department, it is absolutely necessary that such appropriations be promptly made by the national government as will enable this Commission to work with those advantages of government support that have been enjoyed by the managers of recent international exhibitions in Europe.

"Is it not the more incumbent on the government of the United States to extend such aid in this case, because the Exhibition is, according to the law authorizing it, a national celebration of the origin of the nation? But even without such an incentive, the government of this republic would be untrue to the very principles on which it is founded, were it now to recede from its announced intention of adding another to the series of those great international concourses which are held in the interests of industry and peace, and which do more for the elevation of labor and the recognition of its true dignity than any other institution of the age.

"Some of the leading industrial nations of Europe, and several of the American republics, in response to the official communications addressed to them by the Executive of the United States, in obedience to the special requirement of the act of Congress, have, as you are aware, given notice of their decision to take part in the International Exhibition."

Scientific and Technical Notes.

Mr. John E. Fuller, of Boston, has lately introduced an improvement on his

COMPUTING TELEGRAPH,

invented several years ago. It consists of a square board made of old tarred rope, a material which is not given to expansion or warping. Upon this is pasted an engraved card, which has a graduated circle of the diameter of 8½ in. Within this circle there is an inner circle, which revolves, and is graduated in the same manner as the outer circle. The divisions are from 0 to 10, completing the circle, and are the same for both; the divisions are similar to those of the ordinary slide rule, and decrease in a perfectly regular logarithmic order. In fact, the instrument is a circular slide rule. It possesses a great advantage over the ordinary straight slide rule, in consequence of its length (the actual length of the rule being 26·7 in.); this advantage is further increased from the circular arrangement being endless, only one scale of 0 to 10 is required, whilst in the ordinary rule, one wants 0 to 10 and 10 to 100.

The instrument, in fact, forms a slide rule of a very perfect character, and enables one to work out the simplest and most complicated arithmetical question. In calculations where the same factor has to be used many times, the saving of time is simply enormous. Where in a multiplication sum the product is over four figures, and accuracy may be required, it is only necessary to make a mental calculation as to the tens and units, the computor will furnish the leading figures; for instance, 565×179= 101,135, the slide rule at once shows the 1011, and a small mental calculation gives 35 as the final figure. For engineers of whatever kind, such a calculating machine is invaluable, and no engineer's office, electrician's testing room, or manufacturer's counting house should be without it.

At a meeting held at the Royal Institute of British Architects, a short time ago, a paper on

STEAM SAWING, METAL WORK AND TIN FOIL DECORATIONS

was read by Charles H. Cooke, Esq., Fellow, to introduce to the notice of the profession a new style of decoration which has been used with good effect in France for some time past. We quote as follows: I am desirous of drawing the attention of the members of this Institute to a new mode or operation of metal working recently perfected in Paris, and applicable to iron, brass and zinc, and this, without any attempt to imitate wrought or cast iron, combines the advantages of both, and expresses itself simply and plainly as "cut work." The cutting of these metals is effected by a steam saw, the hardness and make of the saw being in reality the secret of the whole work, and, as you will see by the various specimens now exhibited, offers the greatest facilities for the conception and working out of the most intricate and delicate designs obtained by no other means. The zinc work, it is believed, will stand in this country, as it has in Paris, the effect of the weather without painting. This method of cutting through hard metals has been brought to great completeness, as M. Delong & Co. inform me they can now cut brass and copper 3 inches thick and wrought iron 1 inch thick. The face of the work can be chased or engraved as desired, and, in reply to a letter from the agents appointed for England (Messrs. Morgan, Allsopp & Co.), Delong & Co. write, under date January 9, that after the pattern required has been cut by the saw it can be heated, and the twist at the ends, or points, so frequent in wrought work, can be given, and certain portions of the ornamental work raised or depressed, as desired; this, with the engraved work shown in the monogram, forms a combination in metal working hitherto unknown. Having been the first, I believe, to use this new kind of work in London, I have taken considerable interest in its development, and several of the panels now exhibited have been made from my designs for different works in hand, and for which I have sent the drawings to Paris, full size, and can bear testimony to their accuracy in working and their promptness in execution; in addition to which another important point is cost, and this, I find, is moderate, being more than a third less in cost than the same kind of work in wrought iron as usually done. I believe that this mode of working in metals offers a valuable opportunity for the operation of architects. It would be idle to attempt to enumerate the various ways this work may be applied in, for every architect and artist metal worker must be aware it is almost unlimited in its application.

I have now to call your attention to another French patent, but by a different firm to the last, viz., the printing on tin foil imitation of woods or marbles, applicable to wall decoration, woodwork, houses and furniture, which will be found, on examination, to possess many advantages. Some will, I know, object to it as a sham; but we must have some shams, and for my part I look upon this as a very good and useful sham, especially when you can put this work upon damp walls and decorate the surface at the same time; beside which it offers great facilities for decoration in places where it is difficult to obtain skilled labor, and the ease and speed with which it can be used will be specially valuable, either in new buildings or temporary erections, and be a great boon, I believe, to our colonists. For halls and staircases it certainly will be much more effective and serviceable than paper-hanging as now used. From the extreme thinness of the material it is capable of enveloping the most delicate of moldings, and the surface being varnished and then placed in a hot chamber and subjected to a heat of 120 degrees Fahr., it is rendered permanent and durable. This work can be obtained in rolls two and three feet wide and eighteen feet long.

A patent has been obtained by N. Lloyd, Manchester, England, for a new method of

HEATING STEAM BOILERS.

The part of the invention for obtaining heat consists in dispensing with the ordinary fire bars and in burning coal in a small or pulverized state in one or more tubes of fire clay or other material, the coal being fed from a hopper into the tube or tubes, which are caused to rotate by suitable machinery. Between the tubes and the boiler and other apparatus to be heated there is a chamber in which the products of combustion can be mixed with air, if required, in regulated quantities, so as to insure perfect combustion. The ashes formed travel down the tubes by their rotation and fall into the mixing chamber, from which they are withdrawn, and the flame passes from the mixing chamber direct into the flues of the boiler or other apparatus to be heated. Another part of this invention consists in causing the flame issuing from the revolving tubes to pass through or over pieces of iron which may be conveniently placed in the chamber at the end of the tubes, which chamber is provided with one or more openings through which the pieces of iron are put, and may be removed after having been oxidized. Steam is blown in the tubes at the hopper ends, and passes along with the incandescent gases through or over the iron, air being supplied, if required, as before in the mixing chamber. By this method of heating water, tubes in steam boilers can be increased, and they can be brought to the end of the flues instead of being only in a portion of the flue as at present. Though coal is only named in the foregoing description as the material used for obtaining heat, other substances or materials, such as oils, may be used in the tubes, revolving or otherwise.

A few weeks ago Mr. Spence exhibited to a large audience in London a plan for the use of

WASTE STEAM AS A FUEL.

The method is founded upon a discovery made by the father of the inventor, and announced by him to the British Association at its meeting at Exeter in 1869. The discovery was that steam liberated at atmospheric pressure —that is at a temperature of 212°—and passed into any saline solution having a boiling temperature higher than that of water, would raise this saline solution to its own boiling point. Thus, as Mr. Spence showed experimentally, if we take a solution of nitrate of soda, which boils at 250°, and if we blow into that solution steam at 212°, the temperature of the solution will be raised to 250°, the steam being condensed and yielding its heat. The explanation seems to be that the salt has a stronger affinity for the water in the steam as water than the heat has for it as vapor. The water is, therefore, seized by the salt, and the latent heat is evolved as heat of temperature. A single cubic inch of water made into steam at 212° will raise six cubic inches of water from 32° to 212°, which shows the enormous amount of latent heat that steam contains. In utilizing the exhaust steam (at 212°) from a high pressure engine, Mr. Spence brings it into contact with a solution that has a boiling temperature higher than that of water. For this purpose he prefers to use a solution of caustic soda, on account of its high boiling point, and because it is not liable to act injuriously upon iron. The exhaust steam will raise a solution of caustic soda to a temperature of 375° (more or less, according to its density), and the heated solution is then circulated through pipes in an ordinary boiler, and its heat is radiated, for the purpose of generating steam in the place of heat derived from fresh fuel. If the boiler is at a pressure of 30 lbs. the solution will leave it at a temperature of 250°, so that 125° of heat would have been radiated to the water. The solution having been to some extent diluted by the condensation of the exhaust steam, its capacity for heat will be reduced in a corresponding degree; and if steam at 212° were again blown through it, it would not reach the same temperature as before. It is, therefore, passed into another boiler of ordinary construction, where it takes the place of water, and is concentrated by steam being generated from it. In this way its original capacity for receiving heat is restored. Beside this method of utilizing the waste steam of high pressure engines, Mr. Spence has found the principle equally applicable, and with even greater advantages, to the condensing engine. The solution may be brought in contact with the exhaust steam in an ordinary surface condenser. A partial vacuum is produced, because, although the injected solution may be of higher temperature than the steam, its absorbing power of heat is in the same ratio as that of cold water to steam. The solution is again heated to a degree capable of generating steam, and the vacuum is produced. Mr. Spence maintained that if, by taking advantage of his father's discovery, a mode of utilizing the large amount of latent heat contained in the steam now thrown into the atmosphere could be brought into practical operation, so that this latent heat could be made to do actual work, the discovery, especially at the present price of fuel, would be one of enormous value, and he announced his intention of speedily trying the experiment on a manufacturing scale.

J. A. M. Roe, Uphill, Linlithgow, Scotland, has recently obtained a patent for a new process for

SMELTING IRON SANDS, MINE DUST, &C.,

a process by which the difficulties pertaining to the smelting of finely divided iron ores, iron sands and mine dust are, to a large extent, obviated. His invention consists in the preparation of a mastic from the residues of the distillation of mineral oils, which mastic is used as a cement for binding the iron ore or mine dust together, and by pressure he converts the same into solid blocks, which blocks can then be smelted in a blast furnace. In districts where the aforesaid ores are located near to blast furnaces it may be found economical to mix the ore or mine dust with a due proportion of coal dust, coke breeze, or powdered charcoal, to act as fuel—also a due percentage of powdered lime to act as a flux; this composition to be mixed with the aforesaid mastic, and pressed into blocks as above set forth. The difficulties attending the smelting of such ores hitherto, may be stated as follows: If these ores are used alone they stop up the draught of the furnaces altogether, or are blown out at the throat if the blast is increased to overcome the obstruction. To obviate this difficulty various plans have been tried, by mixing the ores with clay, mud, and other plastic materials, but hitherto without success, on account of the agents employed being of a non-combustible character, the furnaces requiring a larger percentage of fuel, and producing a greater amount of slag than usual.

Some specimens of a new combination of metal, which the French have christened

SMILIFER,

were recently exhibited at the Royal Institute of Architects, London, England. It is said to be as malleable as zinc, and not liable to oxidize, while at the same time it is capable of receiving as high a polish as steel, and can be either gilt or bronzed as desired. The expansion is about the same as copper and two-thirds that of iron, while, owing to the facility of working, the cost is very moderate.

The following points, made by P. Muir, concerning the

ACTION OF DILUTE SOLUTION OF SALTS ON LEAD,

will be found of interest:

1. A nitrate, and particularly ammonium nitrate, increases the solvent power of water for lead more than any other salt experimented with.

2. Small quantities of nitrates seem to increase this solvent power nearly as much as larger quantities. A litre of water containing ·02 grm. of a nitrate, was found to dissolve nearly as much lead in a given time as double the quantity of salt.

3. Chlorides, at least calcium chloride, do not increase, but rather diminish the action of water on lead, and that, too, when the water contains a nitrate.

4. Carbonates diminish the action of water on lead more than other salts. One part of potassium carbonate in three thousand parts of water will prevent almost entirely the action of water on lead.

5. Sulphates behave like carbonates, though they are not quite as effectual in their action as carbonates.

6. Water containing a nitrate, and at the same time a carbonate and a sulphate, will have but little, if any, action on lead.

A new method has been recorded by the *Mining and Scientific Press* of

ZINC SMELTING.

By this process, the ore, mixed with carbonaceous powder, is placed in a heated oven situated over a furnace charged with coke or other carbonaceous matter. This furnace is supplied with air preferably heated in such limited quantity as to generate carbonic oxide, which is led hot through the oven above. The ore is thus reduced, and zinc vapor is carried by the gases through exposed passages, wherein it is condensed and from the bottoms of which liquid zinc flows. The condensation of the zinc is aided by keeping the gases under pressure, which is effected by forcing air into the generating furnace, and making the gases, at their final escape, pass a loaded valve. In escaping, the gases bubble through water, whereby any portions of zinc vapor are condensed, and they may then be led to a boiler or other furnace, where such combustible ingredients as they may contain can be utilized as fuel.

Mr. A. Common, of London, England, has recently invented an ingenious apparatus for

PROTECTING WATER-PIPES FROM INJURY BY FROST,

in which the essential part is a closed hemispherical vessel of thin copper, filled with water, which changes its form, and protrudes its flat bottom when the contained water freezes. In one piece of apparatus the protrusion presses in a steel spring and sets free a catch, so that a heavily weighted arm falls, and in doing so turns off the cock at the water-main and opens a waste from the service-pipes of the house. In another contrivance a pipe passes from the frost vessel, left in the outer air, through the wall to the lower part of the service pipes of the house, and when the flat bottom of the vessel is protruded by frost it pushes a plunger through the pipe, and thrusts a closely fitting valve off a shoulder, so that a drip is established from the house service pipes through a waste opening. When the frost ceases the plunger is drawn back by the tension of a spring, and the drip is stopped. A third form of the apparatus in principle resembles the first, but is intended to be fixed upon the supply outlet of a cistern, so that on the occurence of frost the falling of the loaded arm closes the cock, and prevents any water from passing to the service pipes, unless when the lever is drawn up by a cord. If the frost is still present the cock is again closed as soon as the cord is loosened, but if the frost is gone the catch comes once more into play, the arm of the lever is detained, and the cock left open.

The official report of the Vienna Exhibition gives the annual products of iron in the producing countries as follows: England (1871), 134,664,277; Zollverein (1871), German Bund, 33,296,042; France (1871), 23,630,000; Belgium (1871), 11,406,480; Austrian Hungary (1871), 8,492,122; Russia (1871), 7,208,141; Sweden and Norway (1871), 6,158,347; Italy (1872), 1,474,180; Spain (1866), 1,474,180; Switzerland (1872), 150,000—total, 227,395,069. North America (1872), 46,900,000; South America, 1,000,000; Asia (Japan, 1871), 187,000; Asia (other countries approximated), 800,000; Africa, 500,000; Australia, 250,000—full total, 276,500,000. It will be seen by this statement that England produces more than one-half of the production of the world; North America, about one fifth; France, about one-twelfth; and Belgium one-twenty-fourth; these four constituting the great iron producing countries of the globe.

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Compiled from surveys made with a special view of showing the location and boundaries of the three different kinds of Iron Ores and Coal Measures lying within a radius of about one hundred and twenty-five miles of Chattanooga. It also shows the different Railroads and Navigable Rivers and principal towns within this district, and routes to Washington, New York, Louisville, St. Louis, Cincinnati, Memphis, New Orleans, Mobile, and principal ports on the Atlantic Coast. This map is not published in the intercsts of any individuals nor landed proprietors, but with the view of showing to parties who may be interested in the manufacture of iron a section of country containing three different kinds of Iron Ores (which are shown in different colors), as well as coal in the greatest abundance, and their relative positions to each other. The map is gotten up by the publisher after an intimate knowledge of the country for twelve years, the last year of which he has employed two competent engineers in making special surveys, with a view of making it as nearly accurate as possible. It is about 27 inches by 36 inches in size, upon a scale of 15 miles to one inch, and printed on firm linen paper and put up in cases. It will be sold by subscription only, at the price of five dollars, and will be ready for delivery about the 25th of January next. Subscriptions can be made to the publisher, S. B. LOWE, Chattanooga, Tennessee, to the *American Manufacturer*, Pittsburgh, Pa., or to H. B. NEWHALL, No. 11 Warren St., New York.

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Special Notices.

Wanted—Partner,

By an active and experienced furnace man, in the purchase of a charcoal furnace in one of the healthiest regions of Tenn., with about 9000 to 10,000 acres of land, about 6000 first forest growth, about 1000 cleared and improved, the residue in second growth, from 5 to 25 years old. Newly repaired Blast furnace with Hot Blast and all modern improvements, saw and grist mill, store house and office, and sixty good dwellings. Inexhaustible supply of rich brown hematite ore in close proximity to furnace; rail and river shipping facilities. Iron can be manufactured at $18 per ton, and put into market at Louisville or Cincinnati, at $3 to $3·50. For further particulars, address,

A. DUBOIS,
Clarksville, Tenn.

STERLING
IRON & RAILWAY CO.
MAKERS OF

STERLING ANTHRACITE PIG IRON

FOR FORGE AND FOUNDRY USE.

A. W. HUMPHREYS, Treas.,
42, PINE ST., N. Y.

Co-Partnership Notice.

PHILADELPHIA, January 1, 1874.

W. R. Gurnis is this day admitted as a partner in our firm. The style of the firm remains as heretofore.

MALIN BROTHERS,
Iron Commission Merchants,
No. 228 Dock Street.

To the Trade.

HARDWARE TRADE REGISTER.

1874

Owing to the backward state of trade occasioned by the late panic, we have deemed it advisable to defer the issue of our Trade Register until a later period than usual in order to give its benefits to the trade of next season.

It having come to our knowledge that certain parties, evidently having no reputation of their own, are endeavoring to trade upon our already established reputation, by assimilating our title, and even, in some instances, from what we understand, using our last edition for canvassing purposes, we respectfully anounce to the trade that we are now canvassing for our next edition, which will contain additional features of interest calculated to make it still more valuable than it already is, and render it indispensable as a work of reference to the trade. **and we ask them to withold their advertising favors until our agent may call upon them.**

Please Notice that we always have a printed form, bearing our address 4 & 6 Warren St., for orders for advertisements, and that they are payable only to the order of the Manager.

The Merchants and Manufacturers Agency,
(MERCANTILE.)
No. 4 & 6 Warren St., N. Y., Publisher.

CAUTION

No advance payments required for regular advertisements; but **all small matter is payable in advance.** And our only authorized agents to collect money are invariably provided with a certificate of authority, bearing our official seal, and signed by the manager, and are instructed always to give our printed receipt stamped with our seal and countersigned by the party receiving the money.

S. W. THOMPSON, Manager.

For Sale, &c.

To Iron Manufacturers.

For Sale,

One of the best located sites for a large **IRON FOUNDRY AND MACHINE SHOP,** is now offered For Sale on favorable terms. The advantages are, both water communication and railroad on and through the premises. Location at Trenton, N. J. Lot, from one to seven acres in size to suit purchaser. Apply to

SAMUEL L. BAILEY & SON,
45 East State Street, TRENTON, N. J.

FOUNDRY PROPERTY

For Sale, or to lease with privilege to buy consisting of Foundry, Machine Shop, with powerful steam engines, and other buildings. Water front on North River, Peekskill, 42 miles from New York, comprising 2¼ acres. Apply for particulars, to

C. E. APPLEBY, 167 Broadway.

FOR SALE.

Valuable **IRON FURNACE,** about quarter of a mile from a station on the Pennsylvania Railroad, in Huntingdon county. This furnace is in complete running order, has Steam and Water Blast Fixtures, with new Hot Blast and can be run with either charcoal or coke. Attached to the furnace are 175 acres of land, all in cultivation, on which there is a two story office and 14 dwellings. 4000 acres of timber and good Iron Ore Land in the immediate vicinity of this furnace can be purchased, if desired. For particulars and terms, apply to

NISBET & HEISLER,
808 Walnut St., Phila.
Or **J. M. GREEN,**
Milesburg, Centre Co., Pa.

FOR SALE,

Or to lease on liberal terms to Manufacturers, building sites and water fronts on the property of Steinway & Sons, comprising 400 acres of land, with 4000 feet of water front on the East River, situate in Astoria, opposite 120th street, New York, and presenting unsurpassed facilities to the Iron Trade. The Saw Mill, Iron Foundry and Machine Shops of Steinway & Sons have been erected on the ground, and are in full operation, and their entire Piano Manufactory will be removed to the premises.

For further particular address or call on

STEINWAY & SONS,
Steinway Hall, N. Y.

For Sale.

Valuable Iron Mill FOR SALE,

AT

ROME, GEORGIA.

Pursuant to a decree in Chancery, in Floyd Superior Court, the undersigned have been appointed Commissioners to receive sealed proposals until the 1st day of May next, for that valuable property in the city of Rome, in said State and county, known as the **ROME IRON WORKS,** more particularly described as follows:

The property of the Rome Iron Manufacturing Company consists of the Rolling Mill Building 200 x 140 feet, well finished and substantially built, with heavy truss roof. A train of 18 inch Puddle and Bar Rolls, and 9 inch Guide Mill. Two Horizontal Engines of 120 Horse-power each, to drive Rolls; two [2] heavy Steam Shears; Rolls and Saw for making light T Rail; twenty Nail Machines and one Spike Machine—also one Railroad Spike Machine—all with counter shafting and belting complete to run the same. One Beam Engine of 120 Horse-power to run Nail and Spike Machines; one 72 inch Demphill Fan-Rock and Ore Crusher; Furnace for heating Nail Plate and six large Grind and Bead Stones substantially set on Iron Frames; three Heating Furnaces; three Puddling Furnaces [two double and one single]; one 30 ton Track Scale, with side track in the mill; twelve Cylinder Boilers, 30 feet long, and a Battery of 2 fine Boilers, 42 inches diameter, 30 feet long; two 16 inch flues supply the steam power. The Cylinder Boilers being placed over the Heating and Puddling Furnaces use the waste heat from the furnaces for generating steam. Also one Pumping Engine and Wrought Iron Tank for supplying the mill with water.

The whole mill is most complete in its arrangements for receiving and manufacturing and shipping materials, being probably one of the best arranged mills in the States. The Mill is in excellent order, and in full operation; possesses unlimited facilities for getting Coal and Pig and Scrap Iron cheaply, and has a cash market for its entire products. It has a

Capacity of 125 Kegs of Nails per day.
" " 3 Tons of Spikes per day.
" " 12 Tons Bar Iron per day.

Pig Iron can be purchased for $30·00 per ton; Wrought Scrap from $25·00 to $30·00. A force of Skilled Workmen—old hands—are operating the Mill.

We solicit bids for this property and invite capitalists to come and make personal inspection of the same. All correspondence will be carefully and fully answered. We refer by permission to Noble Brothers & Co., whose Foundry and Machine Works are contiguous to the property described.

CHAS. H. SMITH,
T. W. ALEXANDER,
C. ROWELL. } Commissioners.

STEAM ENGINE, ROLLING MILL TRAINS, &c., FOR SALE.

1 Large Steam Engine 24 in. Cylinder, 5 ft. Stroke, Green's Pattern, Sickles Cut off, good running order. Price $2,500. Run, say, 3 years.
1 Andrews Oscillating Steam Engine, 6 in. Cylinder, 12 in. Stroke, nearly new.
1 Train 18 in. Puddle Bar Rolls.
1 Train 16 in. Finishing Bar Rolls, with a fair assortment of Rolls for Round, Square and Flat Iron, price 2½c. per lb.
1 Train 9 in. (Guide Mill) Rolls for making ¾ to ⅞ in round and square Iron. Price 2½c. per lb.
7—30 in. dia. by 30 ft. Boilers with Columns, and Castings for setting same over puddling or heating furnaces, 2½c. per lb.
9 Sets furnace Castings, 2½c. per lb.
5? ft. 6 in. wrt. Shafting with Journals and pedestal, 5 cts. per lb.
2 Sets Shears for cutting Bar Iron.
1 Roll Lathe.
1 Large Nut punching Machine, nearly new, $450.
4 Washer do. $90 each.
1 Circular Saw and frame for cutting ends of Bars and Rails.

Inquire of **JOHN W. QUINCY,**
98 William St. New York,
or J. W. LEONARD, Somerset, Mass.

Mills and Water Power.

FOR SALE, VERY LOW,

The old "Green River Works" of J. Russell & Co., near the depot at Greenfield, Mass.

The cutlery business having been removed to Turners Falls, the Works near Greenfield depot, with all appurtenances, and about 100 horse power, **will be sold low and on very favorable terms.** The Works, which are on both sides of Green River, consist of Stone, Brick and Wood Factory Buildings, and were used for many years in the manufacture of cutlery; but they are well adapted to any manufacturing business. The property is so situated that it can be divided, if desired, into two almost equal portions.

In view of the nearness of the property to the new Hoosac Tunnel Railroad Line and the beautiful town of Greenfield, it must greatly increase in value.

Here is a rare chance. Who will secure it?

Address or call on *D. C. G. FIELD,*
Treasurer John Russell Cutlery Co.,
Turners Falls, Mass.

SAFE INVESTMENT.

For Sale,

Big Muddy Coal, Timber & Farm Lands.

The whole or one interest in 746⅔ Acres of the Big Muddy Smelting Coal Lands, in Jackson County, Illinois. Vein 3 and 6 feet in 80 feet from surface; five improved Farms, with 246 acres under fences; Timber, such as White and Burr Oak, Walnut, Poplar, Ash; being 500 acres. The Timber alone will pay for the land. The St. Louis and Cairo Railroad runs through said lands, two miles from Murphysboro, the county seat of Jackson County, Ill. Will sell the whole for $75 per acre, and take half or one-third interest. Address

DORSCHUTZ & ABEND,
Owners of three Mines in St. Clair Co., Illinois,
Belleville, St. Clair Co., Ills.

For Sale, &c.

FOUNDRY FOR SALE.

The undersigned offer For Sale, to close a trust, the foundry property owned and lately occupied by Silas Merchant, in the city of Cleveland, O. One parcel of land is 503 feet on the west line of Alabama street, by 233½ feet deep, with tracks of L. S. and M. S. R. R. on the north, and C. and P. R. R. on the south. Another parcel is 135 feet on the east line of Alabama street, and 625 feet on the north line of Lake street. On the premises are the necessary buildings, machinery, and all other appliances requisite for the economical manufacture of Water Pipe, Gas Pipe, Car Wheels, and Miscellaneous Castings, the whole being in perfect order, ready for immediate use, and believed to be the most complete establishment of the kind in this country. For price and terms (*which will be liberal*) Apply to

C. S. RHODES AND **N. W. CUTTER** } Assignees of SILAS MERCHANT.

CLEVELAND Ohio, Feb. 14, 1874.

FOR SALE.

A first-class Hardware Stove and Tin Store, located in one of the best towns in Ohio, doing a business of about $65,000 per year. Stock will invoice about $18,000. Satisfactory reasons given for selling.

Address, **N. & B.,**
Care **Office of The Iron Age,**
10 Warren St., N. Y.

Hardware and Paints.

For Sale, an old established Hardware Store, doing a safe and profitable business in a growing manufacturing town. Stock about $12,000, in good order and well assorted. Address,

W. R. BIXBY & SON,
Vergennes, Vt.

FOR SALE.

Rolling Mill at Memphis, Tenn,

Containing one 9 inch train, one 16 inch train—squeezers, shears, &c., one small mill heating furnace, one sand scrapping or bar furnace, one single puddling furnace, one double puddling furnace, with all appurtenances, plates, tools, &c. Everything in good running order and modern style. Home market for sales and material. Coal, 13c. to 18c. per bushel. Will be sold low. Address,

M. J. WICKS, Memphis.

HARDWARE STORE.

For Sale, a first class Tool and Hardware business, situated in the best business part of Jersey City. Established about 25 years, and in flourishing condition. Apply to **H. LUTTGEN,**
57 Montgomery St., Jersey City.

SECOND-HAND MACHINERY

For Sale.

We have now on hand and will sell at very moderate rates, the following lot of second-hand machinery, viz.:

Five Double Hoisting Engines, suitable for mining, tunneling or other purposes. Each of these engines has two cylinders, 7½ in. diam. by 18 in. stroke; two drums, 4 ft. diam. by 4 ft. long; geared to engine in proportion of 8 to 1, and are provided with disconnecting gear and friction brakes.
One 8 Horse-Power Portable Lane & Bodley Engine. Cylinder, 6 in. by 12 in., nearly new.
One 25 Horse-Power Portable Engine, in first rate condition. Cylinder, 10 in. diam. by 24 in. stroke.
One 30 Horse-Power Portable Engine, with Circular Saw Mill and Saw complete.
One 12 Horse-Power Stationary Engine. Cylinder, 8 in. by 12 in.
Five 4 Horse-Power Stationary Engines. Cylinder, 4 in. by 10 in.
One 30 Horse-Power Locomotive Boiler, in first-rate condition, nearly new.
One 25 Horse-Power Locomotive Boiler, in first-rate condition, nearly new.
One 30 Horse-Power Vertical Boiler.
One 20 Horse-Power Vertical Boiler.
Two Fine Boilers, 26 ft. long, 42 in. diam., each with two 14 in. flues, in good order.
Four No. 6 Sturtevant Blowers.
One No. 2 Sturtevant Blower.
Two No. 4 McKenzie Blowers.
One No. 6 Andrew's Centrifugal Pump.
One No. 6 Turbinate Centrifugal Pump.
Seven No. 0 Cameron Pumps.
One Knowle's Pump.
One Earle Pump.
Three Woodward Pumps.

For further particulars, address,

WM. E. TANNER & CO., Richmond, Va.

Valuable Iron Works, For Sale.

The undersigned offers for sale the Iron Works in Pottsville, Schuylkill County Pa., known as "The Washington Works," consisting of a

Large Stone Machine Shop & Foundry,

Brick Pattern House, Erecting Shop, Stone Blacksmith Shop, Brick Office, and Lot of Ground containing in front 195 feet 3 inches, and in depth 260 feet.

There will be sold with the above a large and valuable collection of Patterns, Heavy Crane Flasks and Heavy Core Spindles for making heavy Castings and Pipes of all sizes; Turning and Planing Tools.

The Works can be put in immediate operation A favorable opportunity is here presented for enterprising men. The demand for Castings and Machinery is constantly increasing in this region. The property will be sold on liberal terms. ***If not sold in a reasonable time it will be for Rent.***

For particulars apply to

J. W. ROSEBERRY, Trustee,
Pottsville, Pa.

Iron Foundry For Sale.

Any person wishing to engage in the foundry business, may learn an opportunity to purchase new building just erected for said business, all complete and ready to be started without delay or additional expense. A shovel factory adjoining the foundry will furnish a large and regular demand for castings. For further particulars, address,

H. F. A., Box 488, Northampton, Mass

Or said property would be exchanged for unencumbered productive real estate.

FOR SALE.

Hardware, Stoves & Tinware & Business House,

Doing a **Cash Business** of **$20,000 per annum** at **25 per cent. profit,** in **Central, Ills.** For information address **"W."**

Office of The Iron Age, 10 Warren St., N. Y.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, March 4, 1874.

As there has been no revival of activity in Wall street since last week, there is but little of interest to report in the various departments of the financial market. The chief topic of interest has been the new Treasury policy, announced on Monday, which is to sell $3,000,000 gold, as follows:

March 5	
March 12	$1,000,000
March 19	500,000
March 26	1,000,000
	500,000
Total March sales	$3,000,000

As there is known to be less than $20,000,000 in the Treasury, against about $400,000,000 outstanding gold obligations, this announcement caused no little surprise. Since Monday securities have been heavy, and will probably continue so until Congress shall, by some definite action, remove the uncertainty which now exists. Petitions have been sent to both Houses, asking that the Secretary of the Treasury be deprived of the power he now has—or, at least, exercises—to vary at pleasure the volume of the legal tender circulation. What Congress will do is still as uncertain as ever. Its present policy of masterly inactivity is fatal to the recovery of business, but as there is no possible use of urging action, we refrain from doing so.

Money has been abundant in Wall street during the week, and call loans have been easily obtained at 3@5 per cent. There is but little demand for it even at these figures. Prime commercial paper is fairly quotable at 5 @ 6½ per cent.

The gold market has been steady and heavy, with but little speculation. The following shows the daily range of the premium:

	Highest.	Lowest.
Thursday	112¾	112¾
Friday	112¾	112¾
Saturday	112¾	112¾
Monday	112¾	112¾
Tuesday	112¾	112¾
Wednesday	112¾	112¾

The stock market has been dull and barely steady, with a tendency to weakness. The principal dealings have been in Western Union, Union Pacific, Lake Shore, Wabash, St. Paul and N. Y. Central. We give below the highest and lowest of to-day's quotations.

Government bonds have fallen a little in sympathy with gold, but are firm at present prices, which we give below.

The last bank statement shows unimportant changes. The total reserve has fallen $110,300, and the total liabilities have increased $100,800. The banks now hold $21,743,450 lawful money above 25 per cent. of their total liabilities, which is $135,500 less than last week. The loans of the city banks have fallen $674,900 during the week. The following is a comparison of the averages for the past two weeks:

	Feb. 21.	Feb. 28.	Differences.
Loans	$283 230,600	$282,555,700 Inc.	$674,900
Specie	28,363,000	26,488,300 Dec.	1,874,700
Leg. Ten.	60,150,600	61,915,000 Inc.	1,764,400
Deposits	239,676,300	233,861,300 Inc.	1,715,000
Circ'lation.	26,671,300	26,775,100 Inc.	97,000
			3,300

The movements in foreign trade for the week are as follows:

IMPORTS.

	1872.	1873.	1874.
Total for week	$14,600,713	$9,394,736	$9,972,300
Prev. reported	54,842,595	63,675,992	52,070,609
Since Jan. 1	$69,443,308	$73,070,728	$62,042,909

Included in the imports of general merchandise for the week are:

	Quant.	Value.
Brass goods		$1,814
Bronzes	17	180
Chains and anchors	1	
Copper	174	9,075
Cutlery		290
Guns	84	29,605
Hardware	136	6,300
Iron pig, tons	59	6,061
R. R. bars	1,321	42,056
Iron cotton ties	2,436	48,424
Iron tubes	314	1,104
Iron, other, tons	20	209
Lead, pigs	9	226
Metal goods	1,375	8,240
Nails	128	22,786
Needles	3	330
Old metal	12	6,166
Platina		14,124
Plated ware	2	5,119
Per. caps	1	115
Saddlery	13	1,810
Steel	6	1,722
Silverware	1,988	22,349
Tin. boxes	4	376
Tin, 455 slabs	26,556	232,080
Wire	22,718	5,697
	79	5,325

EXPORTS EXCLUSIVE OF SPECIE.

	1872.	1873.	1874.
For the week	$5,075,113	$5,252,908	$3,934,686
Prev. reported	32,512,231	39,047,067	43,477,663
Since Jan 1	$37,587,344	$44,299,975	$47,412,349

EXPORTS OF SPECIE.

Total for the week	$431,332
Previously reported	4,791,835
Total since January 1, 1874	$5,223,169

Government bonds closed as follows:

	Bid.	Asked
U. S. Currency 6s	116	116¼
U. S. 6s 1881, reg	118¾	119
U.S. 6s, 1881, cou	119¼	119⅝
U. S. 1862, 5-20 reg	116	116¼
U. S. 5-20 1862, cou	116⅛	117
U. S. 5-20 1864, reg	118	118¼
U. S. 5-20 1864, con	118	118¾
U. S. 5-20 1865, reg	118	118¾
U. S. 5-20 1865, cou	119¾	120¼
U. S. 5-20 1865, reg. new	117¾	118
U. S. 5-20 1865, cou	118	118¼
U. S. 5-20 1867, reg	118¼	118¾
U. S. 5-20 1867, cou	118¾	119
U. S. 5-20 1868, reg	118	118⅛
U. S. 5-20 1868, cou	118¼	119
U. S. 10-40 reg	112¼	112¾
U. S. 10 40 cou	112¾	113
U. S. 5s 1881 reg	114	114¼
U. S. 5s, 1881 cou	114¼	114½

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	103¾	103
Lake Shore	79¾	77¾
Rock Island	106¼	103½
New Jersey Southern	104¾	104¼
Del. Lack. and Western	109¼	108½
Wabash	48	47
Harlem	130	129
Western Union Telegraph	74¼	73¼
Atlantic and Pacific Telegraph	16¾	16
Northwestern	54¾	53⅝
Northwestern Preferred	71¾	69¼
Milwaukee & St. Paul	43¾	42¾
Milwaukee and St. Paul Pref	69¾	69¼
Panama	115¾	114
Pacific Mail	43	42
Erie	46	44¾
Ohio & Mississippi	30¼	29¼
Union Pacific	34⅜	33¼
C. C. & Ind. Central	30	28¾
Atlantic & Pacific Preferred	17¼	16¾
Hannibal and St. Joseph	29¾	29

GENERAL HARDWARE.

Business in General Hardware is reported good. Several buyers from the interior have visited the city since our last writing, and some large orders have been placed. Travelers' and letter orders continue to be well filled, and we hear of few complaints.

We have received the following letter from Alfred Field & Co., which explains itself:

Office of ALFRED FIELD & Co.
NEW YORK, March 2, 1874.

To the Editor of The Iron Age: We beg to advise that the following are corrected discounts on goods of Messrs. Withington, Cooley & Co.'s manufacture, list of which was published in *The Iron Age* of Feb. 19, viz.:

Socket and Solid Shank Hoes	dis. 30 per cent.
Solid Shank Planter's Hoes	
Weeding Hoes and Rakes	
Garden Rakes	
Potato and Manure Forks	
"Star" Hay and Manure Forks	
"Nonpariel" Barn Forks	
"W. C. & Co." Hay, Manure, Spading, and Mining Forks	
"B. Norris & Co." Forks	
Grain Cradles	
Scythe Snaths	dis. 25 per cent.
Revolving Horse Rakes	
Corn and Hay Knives	
Fingers, Handles and Ferrules	net.

dis. 20 per cent.

We also beg to state that our agency for these goods in the United States is confined to a portion of New York and all the New England States. We find it necessary to make this announcement because we are receiving letters of inquiry from parties outside of our territory.

Yours, very truly,
ALFRED FIELD & Co.

The Lock manufacturers yesterday (Tuesday, March 3d) advanced the price of all Locks, Knobs, Escutcheons, etc., to discount 45 instead of 50 per cent. The 2 per cent. for cash in 30 days remains as before. At the same time they reduced the price of Knobs, so that on medium goods the prices of Locks with Knobs will net about as before. The following are the old and new prices of Knobs:

2¼ inch Mineral, Japanned Mountings, $3 instead of $2·75 per dozen.
2¼ inch Porcelain, Japanned Mountings, $2·75 instead of $3·75 per dozen.
2¼ inch Porcelain, Plated Mountings, $6·50 instead of $9 per dozen.
2¼ inch Porcelain, Porcelain Mountings, $7 instead of $9 per dozen.
2¼ inch Porcelain, Plated or Porcelain Rose, extra quality, $9 instead of $11 per dozen.

The following are the numbers of Branford Lock Works' Knobs, of which the prices have been changed, and the new list prices:

Nos. 100 and 102	per doz.	$2·00
" 200 and 202	"	2·75
" 225 and 227	"	7·00
" 245 and 247	"	6·50
" 230 and 232	"	9·00
" 255 and 257	"	9·00

The following are the numbers of Russell & Erwin Mfg. Co.'s Door Knobs, of which the prices have been changed, and the new list prices:

Nos. 400 and 410	per doz.	$2·00
" 300 and 310	"	2·75
" 202	"	6·50
" 203	"	7·00
" 101 and 110	"	9·00

The following are the numbers of Mallory, Wheeler & Co.'s Knobs, of which the prices have been changed, and the new list prices:

Nos. 216 and 218	per doz.	$2·00
" 236 and 238	"	2·75
" 413 and 412	"	6·50
" 414 and 416	"	7·00
" 240, 242, 248 and 250	"	9·00
Closet Knobs.		
" 252 and 253	"	2·00
" 254 and 255	"	2·75
" 256 and 257	"	6·50
" 258 and 259	"	7·00

Horse Shoes advanced again 25 cents per keg on the 2d instant, making the price here (adding 12½ cents freight) as follows:

Burlen	per keg,	$5·87½
R. I. Horse Shoe Co., Perkins Pattern	"	5·87½
" " R. I. Pattern	"	6·37½
Mule Shoes	"	6·87½

We withdraw the quotation of Hotchkiss' Snaps from our regular list of prices, as these goods are out of stock and cannot be furnished by the makers until their new factory is finished. They are now making Mouse Traps and Curry Combs. Snaps will probably be the last goods they resume the manufacture of.

The Hubbard & Curtiss Mfg Co. have made the following changes in prices for Edge Tools, Drill Chucks, &c., to date, from March 5th:

	Discount per cent.
Drawing Knives, Carpenters' Oval Blade	65&5
" " Razor "	65&5
" Coach Makers'	65
" Wagon Makers'	50&10
" Shingle	50&10
" Pony	50&10
Chisels, Socket Framing	50
" Socket Firmer, No. 1	65&5
" Socket Corner	65&5
Carpenters' Slicks	65&5
Chisels, Socket Firmer No. 2, "Knowles extra"	65&5
" " " Paring	70
" " " Coach Makers'	40
Gouges " "	40
Warwick Drill Chucks	40
Victor Drill Chucks	33⅓
Washer Cutters, Smith & King's	25
	20

Sargent & Co. have made the following reductions in their prices of Butts:

		Discount per cent.
277, No. 10, Cast Butts,	Narrow	40
277, No. 10, "	Broad	40
278, No. 15, "	Narrow and Broad	40&10
279, Parliament Butts		50&10
279, Mayer's Hinges		45
280, No. 20, Cast Butts, Broad		45
281, No. 50, " "		40&10
282, Nos. 53 and 56, Cast Butts		50&10
		50

Beside the regular 10 per cent. cash discount.

The New England Butt Company publish, under date of the 2d instant, the following prices and terms of sale:

Cast Butt Hinges.

	Dis. per cent.
Wire Narrow and Broad Fast Joint Butts	40
Common Narrow and Broad Fast Joint Butts	50
Narrow and Broad Loose Joint Butts	60
Parliament Butts and Mayer's Hinges	

Parties whose net orders for Butts alone amount to $250 or more, for each six months ending June 30th and December 31st of each year, will be entitled to a discount of 5 per cent. on net.

Other Hardware.

Sad Irons	5 cts. per lb.
Laundry Irons	8 " "
Tailors' Irons	8 " "
Dumb Bells	5 " "
Butterworth's Window Springs, No. 1	$16·00 per gross
" " " 3	24·00 "

All other Miscellaneous Goods, 5 per cent. above list prices.

"On receipt of order the goods will be sent so far as our stock will permit, and any balance remaining will be sent as soon as possible at prices ruling on the day of shipment. Orders received on no other terms. Goods will be delivered on wharf, by the ordinary freight conveyances, at New York, Philadelphia and Baltimore; and in Boston at the depot of the Boston and Providence Railroad Company. No allowance for cartage or wharfage in the above named places."

Horace Durrie & Co., sole Eastern agents of the Ohio Butt Co., issue a circular under date of the 27th ult., in which they quote these goods as follows:

	Dis. per cent.
Narrow Fast Joint, Drilled and Wire Jointed	35
Broad, " " "	
Panel Pattern	
Broad Loose Joint, Drilled and Wire Jointed	50
Loose Pin Reversible, Drilled, Panel Pattern, Plain	60
Loose Pin Reversible, Drilled, Panel Pattern, Japanned	45
Loose Pin Reversible, Drilled, Panel Pattern, Japanned, Silvered Acorns	45
Loose Joint, Drilled, Japanned	45
" " " Acorns	55
" " " Silvered Acorns	55
Japanned Screws, 25 per cent. advance on old list.	55

Purchases amounting to $250, each six months ending June 30 and December 31, of each year, will be entitled to 5 per cent. extra discount.

They print the following conditions of sale:

"Goods delivered from store in New York, or on dock at Boston, Philadelphia and Baltimore. On receipt of order, if we have the larger portion of the goods ordered on hand, and should be obliged to hold the order some days to fill complete, we ship the sizes on hand immediately, sending the balance as soon as possible, at prices ruling on day of shipment. Orders received on no other terms."

Abraham Bussing, secretary of the Ausable Horse Nail Company, issues a circular dated the 2d instant, quoting the prices of their Nails without change. This company are engaged in a determined effort to prevent any cutting of their prices, and to this end make the following terms of sale, to which they give the emphasis of prominent type in their circular, and which, they inform us, they will impartially enforce in all cases:

Invoices will be rendered and settled at full list prices only, and discounts made and credited on July 1st and January 1st, to parties entitled thereto. Orders from parties who persistently sell or offer our Nails at less than our current rates will be declined. Discounts will be allowed only to those against whom we have no positive legal evidence of underselling said rates. Your orders will hereafter be received subject to these conditions, which will be strictly adhered to in all cases.

The improved demand for foreign Hardware noticed last week has given place to greater activity, and we notice some large shipments being made. There are no changes to note in the prices of heavy goods, and ⅜ inch Coil Chain continues to be quoted at 22/ in Birmingham, and 9 cents, gold, here. Traces are in fair demand, but the supply is unusually light for this time of year. It is, however, worthy of remark that orders for this class of goods meet with a prompt response on the part of English manufacturers.

There is a fair demand for Nails, some houses reporting the amount of goods sold in February fully equal to the same month in previous years. On the other hand, we have heard complaints of dullness, owing to unfavorable conditions relative to shipping and freights. The price remains as previously quoted, viz.: $4 net, for large or small lots.

There is a marked improvement in the demand for House Furnishing Goods, Tinners' Trimmings, &c., and no changes of importance to note. Joseph Scheider & Co., No. 58 Beekman steet, have published a list of the goods of their own manufacture, but as the prices are not attached, we cannot present it to our readers. Their line of Japanned Toilet Ware and Patent Self Righting Cuspadores is very full, and the goods which we have seen will compare favorably with the best goods on the market, while the price, we are informed, is as low as good goods can be produced at. Copper Bottoms are quoted at 33 @ 36 cents per lb., net, according to quantity.

We invite the attention of the trade to the advertisement, on 21st page, of Markt & Co., Nos 139 to 143 Centre street, manufacturers of Hardware specialties and importers of Wire Cloth, Bright Halter and Coil Chain, beside a large variety of Upholsterers' Hardware and Trimmings. In the department of Wire Cloth this house takes a prominent position; they carry a large and well assorted stock of all the leading patterns, both fancy and landscape, in general use for Window Screens. In plain colors their assortment is complete, and includes all widths from 24 to 48 inches. They claim for their Wire Cloth that, having two coats of paint, it is better calculated to stand exposure than the average Cloth sold for that purpose. Prominent among the specialties manufactured by this house are Porcelain, Mineral and Lava Door Knobs, of which we saw some that will bear favorable comparison with anything on the market. They have recently introduced a Porcelain Knob with Bronze trimmings, which is admirably adapted for use where the outside of the door only is trimmed with real Bronze. Of these goods a large number have been sold in Western cities. They also make a specialty of Picture Nails, in Silver, Glass, &c.

The Ætna Nut Co. have discontinued their New York store, and The Peck, Stow & Wilcox Co. will in future keep a full line of their goods in stock, which they will sell in their own name at factory rates. Mr. Campbell, formerly in charge of the Ætna Nut Co.'s business in this city, has transferred his services to The Peck, Stow & Wilcox Co.

Lane Brothers, Millbrook, N. Y., manufacturers of Swift's Patent Coffee, Corn and Spice Mills, inform us that the discount from their list for these goods is 20 per cent. On the 13th page they illustrate their No. 7 Coffee Mill, which is a handsomely finished machine, with large burnished brass hopper, 40-inch fly-wheel, the extreme hight of the mill being a little over five feet. We are informed that the demand for these goods is steadily increasing, and the manufacturers aim to make them the best goods of their kind in the market.

Linforth, Kellogg & Co., San Francisco, Cal., are agents for the Pacific Coast for a number of leading manufacturers, as will be seen by their advertisement on the 20th page. Wm. B. Fox has charge of their office in this city, at 96 Chambers street.

John W. Quincy, 98 William street, offers for sale a lot of valuable Rolling Mill Machinery, full particulars of which will be found among Special Notices, on the 16th page.

The well-known firm of Nathusius, Kugler & Morrison, of this city, have issued a circular under date of 2d instant, announcing the dissolution of their partnership. Particulars will be found in advertisement on 16th page.

D. R. Barton, the well known Edge Tool manufacturer of Rochester, N. Y., having sold out his interest in the firm of D. R. Barton & Co., is about to start again in the same business on his own account, and has purchased the property on Mill street, corner of Furnace street, Rochester, known as the "Fisk Building," for his new enterprise. We copy the following in explanation from a Rochester paper of recent date:

The Messrs. Mack purchased the right of using the trade-mark of D. R. Barton & Co.; but Mr. B. has the right to manufacture and use the individual name of D. R. Barton, all of which he intends to do. The name of David R. Barton has long been associated with the business interests of Rochester, and our citizens would be very sorry to lose him from its circle of manufacturers.

Lloyd, Supplee & Walton have sent us a pamphlet containing price lists, descriptions and illustrations of the goods made by them. Also a discount sheet for same, dated 2d inst. The following circular is introduced in the pamphlet:

PHILADELPHIA, Feb. 24, 1874.

I have this day signed a contract authorizing Messrs. Lloyd, Supplee & Walton, of No. 625 Market street, Philadelphia, to manufacture my Patent Hollow Auger and Patent Saw Vise, under royalty. Inspection of other goods manufactured by them convincing me that all attention will be given to produce articles of good quality and finish. Yours, truly,

G. N. STEARNS, Syracuse, N. Y.

The goods made by Lloyd, Supplee & Walton include a number of valuable patented specialties. Those who are not acquainted with the goods should send for the list. We have compiled the following table of list prices and discounts:

Stearn's Patent Hollow Auger—dis. 25 %.
Per doz. $48·00

Bonney's Patent Adjustable Hollow Auger—dis. 25 %.
Per doz. $48·00

Bonney's Improved Patent Saw Vise—dis. 20 %.
Per doz. $20·00

Stearn's Patent Saw Vise—dis. 20 %.

Bonney's Self Adjusting Double Edged Spoke Shave—dis. 15 %.
Per doz. $10·00

Bonney's Spoke Trimmer—dis. 25 %.
Per doz. $10·00

Bonney's Improved Patent Double Jaw Carpenters' Clamp—dis. 25 %.

5 inch	per doz.	$9·00
7 "	"	12·00
9 "	"	15·00

Bates' Breast Drill—dis. 25 %.

No. 1	per doz.	$40·00
No. 2	"	48·00

Scandinavian Security Pad Locks—dis. 15 %.

No. 9, Red, 6 Tumbler	per doz.	$10·50
No. 10, Red, 6 "	"	10·50
No. 10½, Black, 6 "	"	12·00
No. 11, Red, 8 "	"	12·00
No. 11½, Black, 8 "	"	15·00
No. 12, Red, 8 "	"	15·00
No. 12½, Black, 8 "	"	18·00
No. 13, Red, 8 "	"	18·00
No. 13½, Black, 8 "	"	22·00
	"	22·00

Brass Pad Lock—dis. 25 %.

No. 625. 2½ inch Brass Pad Lock, three tumblers, two flat Keys to each Lock, per doz. $14·00
No. 626. 2½ inch Brass Pad Lock, three tumblers, with two flat Keys to each Lock, with lag to attach chain, per doz. 15·00
No. 630. 1¾ inch, Spring, Regular Keys, per doz. 8·00
No. 631. 2½ inch, Spring, Regular Keys, per doz 12·00

Iron Pad Locks—dis. 20 %.

No. 600. 2½ inch, Iron Spring Pad Lock, with lag to attach chain, per doz. 6·00
No. 602. 2½ inch, Malleable Iron Pad Locks, three brass tumblers, two flat keys, (style of 625), per doz. 8·00
No. 603. 2½ inch, Malleable Iron Pad Locks, three brass tumblers, two flat keys, with lag to attach chain, per doz. 8·50

Bonney's Patent Gate Hinges.

Nos. 0 and 1	dis. 25 %
Nos. 2 and 3	dis. 35 %
No. 0, Complete with Latch	per doz. $8·00
No. 1, Complete with Latch	per doz. Sets, 6·67
No. 2, Complete with Latch	10·00
No. 2 is adjustable; elevates 4¼ inches.	
No. 3, Complete with Latch, extra strong	12·00
No. 3 is adjustable; elevates 5¼ inches.	

All packed in cases of one dozen sets each.

Bonney's Gate Latch.

No. 10	per doz.	$3·00
No. 11	"	1·50

Bonney's Patent Sash Fasteners, for Weighted Windows—dis. 25 %.

No. 20, Iron Japanned	per gross.	$20·00
No. 30, "Paris" Bronzed	"	28·00

Bonney's Improved Surface Sash Lock, used in Place of Weights—dis. 25 %.

No. 1, Japanned, Blued Screw	per gross.	$9·00
No. 2, " Brass Cap'd Screw	"	10·00

Bonney's New Patent Door Bolt and Lock Combined—dis. 25 %.

8 inch	per doz.	$9·00

Bonney's Bread Toaster—dis. 25 %.
Per doz. $1·20

Bonney's Pota'o Masher—dis. 25 %.
Per 1oz. $1·20

Bonney's Stove Lifter—dis. 25 %.
Per doz. $1·00

The Wilson Mfg. Co. have just issued a new illustrated list of their manufactures, comprising a large number of Hardware and Ship Chandlery goods. They also manufacture the People's Mower, for which they claim superiority in lightness, simplicity and ease of draught over any other machine made. The list prices and discounts of their various goods have been nearly all changed. We give below the discounts on all goods, and the list prices of the articles most important to the Hardware trade. These discounts are dated March 2d, 1874:

	Dis. per cent.
Braces, Wilson's	10
" Dabell's	10
" Geared	10
Bit Holders	10
Breast Drills, Wilson's	10
" Dabell's	10
Bench Vises, Gray Iron	10
" Malleable Iron	30
Box Chisels	net
Belaying Pins	50
Bed Keys	10
Blocks, Tackle—Gray Iron	20
" Malleable Iron	30
" Brass	10
Blocks, Derrick	10
" Wharf	10
" Quarter	10
Cleats, Malleable Iron	10
Caulker's Tools	20
Castors, Store Truck	20
" Furniture	10
Cooper's Vises	30
" Croze Tools	10
" Rivets	net
Clamp Heads	20
" Cabinet Maker's	10
" Ship Carpenter's	10
Cotton Hooks	10
" Samplers	20
Coin Scales	10
Carpet Stretchers	10
Composition Cocks	30
Card Table Swivels	30
Cloak Pins	30
Coffee Mill Side	30
" Box	15
Door Bolts	15
Drill Stocks	10
" Bows	10
" Geared	10
Door Knockers	10
Fishing Swivels	10
Gridirons	10
Gin Wheels	10
Hooks, Bale and Box	10
" Barrel and Tierce	10
" Boat	10
" Cotton	20
" Hat and Coat	10
" and Thimbles	25
" Match or Sister	10
" Ring Match	25
" Small Eyed Block	10
Hinges, Malleable Iron	25
" Whaleboat	10
Hasps, Malleable Iron	10
Hanks or Rings, Jib, Wrought Iron, Galvanized	10
Jack Screws, Bell Bottom	15
" Straight Barrel	20
" Pinion Wheel	net
Lathes	10
" Wheels	10
" Overhead Pullies, etc	10
Mowing Machines	15
Marlinspikes	20
Mill Screws	10
Pump Chambers	10
Pew Door Butts	10
Piano Forte Stool Screws	20
Pullies, Hot House	25
" Sash	20
" Side	20
" Upright	20
Rivets, Blockmaker's	10
" Oval and Flat Head	25
" Cooper's	net
Rowlocks	net
Rudder Yokes	30
" Braces	10
Riggers Screws	10
Ratchets and Pawls	30
Screws, Bench, Wood Handle	10
" " Iron	30
" Jack, Bell Bottom	30
" " Straight Barrel	15
" Pinion Wheel	20
" Mill	net
" Piano-Forte Stool	10
" Riggers'	20
" Timber	30
" Vise	10
" Whalemen's Press	10
" Shutter	10
" Stair Rail Joint	20
Sheaves, Sliding Door	30
Sliding Door Rail	20
Sheaves, Shutter	30
Shutter Lifts	20
Sash Props	20
" Rollers	20
Stubs and Plates	20
Ship Scrapers	30
Stair Rail Joint Screws	30
Tobacco Cutters	30
Top Mauls	10
Thimbles, Malleable Iron	30
" Tackle and Hooks	30
" Open	25
Tackle Blocks, Malleable Iron	15
" Gray Iron	10
" Brass	30
Vises, Bench, Gray Iron	10
" " Malleable Iron	30
" Cooper's	net
" Solid Box	10
" " from Plans	20
" Box and Screws	net
Well Wheels, Roller	10
" Common	20
Whaleboat Gear	25
	10

WILSON MANUFACTURING CO.'S PRICE LIST.

Braces.

Wrought Iron Brace—Iron Head—Steel Spring.

				Per doz.
No. 1, Steel Front Spring,	8½	in.	sweep	$9·50
" 2, " "	9	"	"	10·75
" 1½, Steel Back Spring,	8½	"	"	9·50
" 2½, " "	9	"	"	10·75
" 3 " "	10	"	"	12 75
" 4¼ " "	12	"	"	15 50
" 4, Steel Front Spring,	10	"	"	14·50
" 5, " "	12	"	"	17·00
" 5½ " "	14	"	"	19·00

Wrought Iron Braces—Iron Heads—Screw Fastened.

				Per doz.
No. 6, Screw Fastened, Japanned,	8	in.	sweep	$5 75
" 6½, " "	smaller, 8	in.	sweep	4·25
" 7, " "	Polished, 9	in.	sweep	8·75
" 15, " "	Polished ends and center, 12	in.	sweep	12·00

Dabell's Self-Centering Brace.

Wrought Iron—Iron Head—Rosewood Revolving Handle,

No. 10,	9	in.	sweep	per doz. $10·00
" 11, 10	"			" 11·00
" 12, 11	"			" 12·00
" 13, 12	"			" 13·00

Wrought Iron—Wood Head.

No. 17,	9	in.	sweep	per doz. $10·00
" 18, 10	"			" 11·00
" 19, 12	"			" 12·00
" 20, 14	"			" 13·00

Dabell's Brace—Double Spring—Patented.

				Per doz.
No. 22, Double Steel Spring,	9	in.	sweep	$11·00
" 23, " "	10	"	"	13·50
" 25, " "	12	"	"	17·50
" 27, " "	14	"	"	20·00

Dabell's Patent Bit Holder.

Bit Holders, per doz. $10·00

Dabell's Patent Breast Drills.

Dabell's Breast Drills, per doz. $27·00
Extra Drills, per set, 75

Wilson's Breast Drills.

Wilson's Breast Drills, per doz. 21·00
Extra Drills, per set, 75

Geared Braces.

Japanned Wheel, per doz. $13·00
Polished Wheel, " 15·00

Parallel Bench Vises.

No.	Size of Screw.	Length of Jaw.	Weight.	Price of Gray.	Price of Malleable.*
00	⅝ in.	2¼ in.	7⅛ lbs.	$2·15	
0	⅝ "	2½ "	10½ "	2 70	$2·25
1	¾ "	3 "	13½ "	3 60	3·25
2	⅞ "	3½ "	16½ "	4 65	4·50
3	1 "	4 "	24 "	6 70	5·75
4	1¼ "	4½ "	35½ "	9·65	

*The above prices of Vises of Malleable Iron are net.

Box Chisels, Steel Claws.

Length.	Japanned.	Polished.
10 in	$4·25	per doz. $6·00
12 in	4·50	" 6·37
14 in	5·00	" 6·75
16 in	6·00	" 7·25

Bench Screws.
Wood Handles

	Diameter Screw.	Length Screw.	Per Screw. dozen.
Wood Handle, Moveable Collar,	1 in.	15 in.	$8·75
" " "	1¼ "	15 "	10·00
" " "	1¾ "	16 "	11·50
" " "	1⅞ "	16 "	13·75
" " "	1⅞ "	16 "	18·00
	1¾ "	24 "	37·00

Iron Handles.

	Diameter Screw.	Length Screw	Per dozen.
Iron Handle	1 in.	13 in.	$11·00
" "	1⅛ "	15 "	13·50
" "	1¼ "	16 "	16·50
" "	1½ "	18 "	24·00

Bed Keys.

No. 1, One Socket, Japanned		per doz.	$0·63
" 2 Two "	"	"	75
" 3, Three "	"	"	1·00

Caulking Irons—Polished.

Crease.		Steel Points.	Cast Steel.
0, Caulking Irons	per doz.	$4 60	8·00
1, " "	"	4 80	8·25
2, Marking Irons	"	5·00	8·50
3, " "	"	5·20	9·00
Bent	"	5·75	10·50
Sharp	"	6·00	10·75
Roofing	"	5·25	7·50
Spike	"	4·75	6·75
Crooked	"	6·50	10·75
Seam Opener	"	6·25	9·50
Coppering Punches	"		6·00

Carpenter's Clamp Heads.

Single Nut.

Diameter of Screw.	Length of Screw.		
1 in.	9 in.	per doz.	$15·00
1¼ "	10 "	"	18·75
1½ "	11 "	"	21·25
1¾ "	12 "	"	31·00

Double Nut.

Diameter of Screw.	Length of Screw.		
1 in.	10 in.	per doz.	$18·75
1¼ "	12 "	"	22·50
1¼ "	13 "	"	27·50
1½ "	16 "	"	43·75

Cabinet Makers' Clamps.

1 in. Clamp Head, Single Nut, with Ratchet and Pawl	per doz.	$18·00
1 in. Clamp Head, Single Nut, with Ratchet and Pawl, on wood frame	per doz.	35·00
1 in. Clamp Head, Double Nut, with Ratchet and Pawl	per doz.	24·00
1 in. Clamp Head, Double Nut, with Ratchet and Pawl, on wood frame	per doz.	41·00

Clamps for Ship Carpenters.

Sliding Jaw.

	Size of Bar. Inch.	Open'g of Clamp. Inch.	Each.
1 in. Screw, Comp. Box,	2¼x⅝	20x4	$6·00
1¼ " " "	2¾x⅝	24x4½	10·00
1½ " " Wt. Iron "	3½x⅝	35x5	13·00

Hook End.

	Size of Bar. Inch.	Open'g of Clamp. Inch.	Each.
¾ in. Screw, Comp. Box,	1¾x⅝	12x4	$5·75
1 " " " "	2¾x⅝	16x4½	4·50
1¼ " " " "	2¾x⅝	20x5	7·75
1½ " " Wt. Iron "	3½x¾	22x6	9·75
1¾ " " " "	3½x¾	24x7	12·25
2 " " " "	4 x 1	26x8	15·00
2½ " " " "	5 x 1	36x9	35·00

Cotton Hooks.

No. 1. Iron, ¾ in. Round, 9 in. Blade,		per doz.	$1·62
" 2. " 7-16 " " 9¾ " "		"	1·87
" 4. Steel, 7-16 in. " 6 " "	New Orleans pattern	per doz.	3·33
" 4½. Steel, 7-16 in. Round, 8 in. Blade, New Orleans pattern		per doz.	4·00
" 5. Steel, 7-16 in. Round, 10 in. Blade, New Orleans pattern		per doz.	4·50
" 9. Steel, ⅜ in. Square, 8 in. Blade, Carman's pattern		per doz.	5·00
" 21. Steel, 5-16 in. Square, 6 in. Blade. Carman's pattern		per doz.	4·20
" 12. Steel, ⅜ in. Square 5⅛ in. Blade, Hay Hook		per doz.	4·20
" 31. Steel, ⅜ in. Square, 6 in. Blade, Red River, Floats		per doz.	4·20

Carpet Stretchers—Steel Points.

Carpet Stretchers, Steel Points	per doz.	$2·00

Side Coffee Mills—Increase Wilson's.

No. 0. Without Covers		per doz.	$3·25
" 1. With "		"	4·25
" 2. " "		"	5·25
" 3. " "		"	6·75
" 4. " "		"	10·50
" 5. " "		"	18·00
" 11. All Iron		"	4·00

Box Coffee Mills—Increase Wilson's.

No. 20. Iron Hopper		per doz.	$8·50
" 30. Britannia Hopper		"	10·50

Gridirons—Wrought Iron—Hollow Bars.

9 Bars	per doz.	$5·00
10 "	"	5·75
11 "	"	6·75
12 "	"	8·00
13 "	"	9·25
14 "	"	10·50

Gin Wheels—Wrought Iron Frames—Swivel Hooks.

Diam. of Sheaves.	Thickness of Sheaves.		Plain.	R'ller.
10 in.	1¼ in., Chain or Rope score.	each	$4·50	$6·00
10 "	1¾ " " "	"	4·75	6·75
12 "	1⅝ " " "	"	6·00	8·00
13 "	2 " " "	"	6·75	9·25
14 "	1¾ " " "	"	7·33	10·00
14 "	2 " " "	"	8·50	11·50
16 "	1½ " " "	"	9·50	13·50
16 "	2 " " "	"	10·00	14·50
18 "	1¾ " " "	"	11·00	16·00
18 "	2 " " "	"	12·00	18·00

Hot House Pulleys.

Size.	Per doz.	Size.	Per doz.
1¼ in. Single	$1·10	1¼ in. Double	$1·85
2 " "	1·40	2 " "	2·15
2¼ " "	2·25	2¼ " "	3·25
2½ " "	2·75	2½ " "	3·75
		2 " Treble	4·00

Improved Single Screw.

Size.	Per doz.	Size.	Per doz.
1¼ in. Single	$1·20	1¼ in. Double	$1·85
2 " "	1·40	2 " "	2·15
2¼ " "	2·12	2¼ " "	3·25
2½ " "	3·75	2½ " "	2·75

Hat and Cloak Hooks.

No. 0, Bronzed		Per gross.	$2·50
" 1, Japanned		"	4·00
" 2, "		"	5·00
" 3, "		"	3·00
" 4, Bronzed		"	3·50

Sash Pulleys—Extra Heavy.

1¼ inch Axle, No. 1, Solid Shell, Painted Face	Per doz.,	$0·55
2 inch Axle, No. 1, Solid Shell, Painted Face	"	0·70

Extra Heavy Axle Pulleys—Turned Polished Wheels and Axles.

1¼ inch Axle, No. 2, Riveted, Painted Face	Per doz.,	$0·70
1¼ inch Axle, No. 2, Riveted, Painted Face	"	0·90
2 inch Axle, No. 2, Riveted, Painted Face	"	1·10
2¼ inch Axle, No. 2, Riveted, Painted Face	"	1·40
2½ inch Axle, No. 2, Riveted, Painted Face	"	1·75
3 inch Axle, No. 2, Riveted, Painted Face	"	2·75
1¼ inch Axle, Iron Wheel, Brass Face	"	1·87½
2 " " " "	"	2·12½
2¼ " " " "	"	2·62½
2½ " " " "	"	3·12½
1¼ " Brass Wheel,	"	3·00
2 " " "	"	4·00
2¼ " " "	"	5·00
2½ " " "	"	6·00
1¼ " All Brass	"	4·00
2 " "	"	6·00

Side Pulleys—Japanned.

1¼ inch Roller, Single	Per doz.,	$0·75
2 " " "	"	0·90
2¼ " " "	"	1·40
2½ " " "	"	1·70
1¼ " " Double	"	1·87½
2 " " "	"	1·87½
2¼ " " "	"	1·50
2½ " " "	"	3·00

Sliding Door Sheaves.

For Sliding Doors, Iron, 3x⅝ inch	Per set,		$0·80
" " " 4x⅝ "	"		1·10
" " " 6x⅝ "	"		1·70
" " " 6x⅝ "	"		2·00
" " Brass, 2x⅝ "	"		1·37½

Sliding Door Rail.

Cast Iron, Japanned or White	Per foot,	5 cts.

Shutter Sheaves.

Iron Frame, Iron Roller, 1¼ inch	Per doz.,		$0·62½
" Brass " " "	"		1·75
Brass Frame " " "	"		2·00

Sash Rollers.

Size of Plate.	Size of Roller. Diameter.	Width.	Per gross.
1¼ x ¾ inch,	⅝	½	$2·50
1¼ x ¾ "	⅝	⅝	2·75
2 x ⅞ "	11-16	9-16	2·87½
2¼ x1 "	⅝	⅝	3·75
2½ x1½ "	⅞	¾	5·00
2¾ x1½ "	1	⅞	5·62½

Sash Pulleys.

No. 1, Japanned	Per gross,	$1·25
" 2, "	"	1·62½

Shutter Screws.

2 inch Screw, Japanned	per gross,	$7·50
2¼ " " "	"	7·62
2½ " " "	"	7·87

Stubs and Plates—Japanned.

No. 1	per gross,	$2·50
" 2	"	2·75

Shutter Lifts.

No. 1, Projecting, Japanned		per gross,	$1·70
" 2, Flush "		"	2·50

Upright Pulleys.

1¼ inch, single		per doz.,	$·50
1¾ "		"	·55
2 "		"	·65
2¼ "		"	1·00
2½ "		"	1·50
3 "		"	2·00
1¼ "	double	"	1·50

Vises—Solid Box.

Vises, weighing from 31 lbs. to 159 lbs., inclusive	per lb. $·18
Vises, weighing from 160 lbs. and upward	per lb. ·22
Cutler's Vises and Vises weighing 30 lbs. and less	each, 6·50

Vise Screws.

20 to 30, Wrought Iron Box, 1 in. Screw, 1¼ in. diameter Box	each, $2·50
30 to 40, Wrought Iron Box, 1¼ in. Screw, 1½ in. diameter, Box	each, 3·25
45 to 75, Wrought Iron Box, 1½ in. Screw, 1⅞ in. diameter, Box	each, 3·75
60 to 75, Wrought Iron Box, 1⅞ in. Screw, 2 in. diameter, Box	each, 4·00
80 to 95, Wrought Iron Box, 1½ in. Screw, 2½ in. diameter, Box	each, 5·50
100 to 125, Wrought Iron Box, 1½ in. Screw, 2½ in. diameter, Box	each, 7·00
130 to 185, Wrought Iron Box, 1⅝ in. Screw, 2½ in. diameter, Box	each, 8·00
185 to 250, Wrought Iron Box, 2 in. Screw, 2¾ in. diameter, Box	each, 10·25

Screws with Composition Box, 15 per cent. advance on price of Iron Box.

Well Wheels—Anti-Friction or Roller Bushed.

No. 1	each,	$1·87½
" 9, Heavy Pattern, strapped	"	2·75
" 1, Wheels without Frames	"	1·25
" 9 " " "	"	1·37½

Plain.

8 inch	per doz.,	$5·00
10 "	"	8·00
12 "	"	10·00
14 "	"	14·00

IRON.

American Pig.—The market for Iron of all kinds is very dull. The furnace companies still refuse to name prices for season deliveries, and buyers show little anxiety to make contracts. The demand is small, but makers have reduced their production as much as possible, and stocks are not accumulating. Gray Forge in particular is scarce, and prices are firmer than they have been for this grade. No further strikes have occurred, but there is an uneasy feeling on the Lehigh, which will probably lead to an advance in wages when the laborers get a favorable opportunity to enforce their demands. We quote without change, for prompt delivery, No. 1 Foundry, $35 @ $36; No. 2, Foundry, $33 @ $34; Gray Forge, $29 @ $31.

Scotch Pig.—There is little business going on in Scotch Iron, and that in a small way. The remarkable decline in Glasgow within the past month (noted from week to week in our cable reports), together with the dullness of business here, has reduced prices here. Our cable report to-day reports some improvement on the other side, but this market has not yet been affected. We quote Coltness, $43 @ $44; Eglinton, $40; and Glengarnock, $40 @ $41. It is, however, difficult to give quotations of this brand on account of some late arrivals being mixed numbers, and very irregular in quality.

Bar.—While there is no change in quotations for Bars, which still remain at 3 1-10c. @ 3 3-10c., there has been, during the past few days, considerable more inquiry. The fact is daily becoming more evident that stocks of Manufactured Iron in the country are very small. The stoppage of the Ohio River Valley mills is diverting the course of Pittsburgh Iron to the West. The Eastern mills, all through the season, have been pursuing a very conservative course by working only to order. Many of them have been closed entirely, while others are running part time. During the past week a few specifications for railroad cars have been in the market, and these, no doubt, will be followed by others, as some of the old companies are known to be short of freighting capacity.

Rails.—There is nothing doing in Rails, and no improvement can be noted. American can be had at $60, currency, at mill. Foreign could not be sold at even $54 @ $55.

Old Rails.—There is no change in the market, and we still quote T's, $40. Some holders ask more, but they can be bought at our quotation.

Scrap.—We quote No. 1 Wrought Scrap, from yard, $41 @ $44.

The following is Messrs. BIGELOW & JOHNSTON's monthly circular, dated Feb. 28, 1874:

NEW RAILS.—A marked dullness has characterized the month now closing, and with the exception of one or two small sales in bond, Foreign Rails remain as formerly quoted. In American, notwithstanding very low offers on the part of the mills, there is a great lack of business. It is generally thought, however, that the wants of our railroads must be large this spring, and if the financial question were once settled in Congress, a vigorous buying movement would soon set in.

Foreign Iron Rails	gold,	$58·00 @ 60·00
American Iron Rails	currency,	60·00 @ 65·00
Import at N. York this month, tons,		....
Previously since January 1 .... "		....
Total to date .... "		....
Same time, 1873 .... "		5,276

STEEL RAILS.—There is considerable inquiry.

Foreign Steel Rails	gold,	$103·00 @ 105·00
American Steel Rails	currency,	100·00 @ 165·00
Import at N. Y. this month..tons,		4,774
Previously since Jan. 1 .... "		4,912
Total to date. .... "		9,686
Same time, 1873 .... "		8,771

OLD RAILS.—A moderate demand was experienced early in the month, but it has now, in a great measure, subsided. Our stock is now reduced to about 5000 or 6000 tons of all kinds.

Double Heads	currency,	@ $45·00
T or Flange, nominally	"	@ 40·00
U or Bridge,	"	nominal.
Import at New York this month...tons,		65
Previously since January 1 .... "		....
Total to date .... "		65
Same time, 1873 .... "		2,739

SCRAP IRON.—There is as yet no movement of consequence, the principal transaction of the month being 1000 tons for direct shipment to an outport from Europe at $44·50, currency.

No. 1 Wrought .... currency, $42·00 @ 45·00

PIG IRON.—In American there is scarcely any change to note; buyers and sellers appear equally indifferent. Some little stir was caused by a threatened strike in the Lehigh region, but so far it has been confined to one company, whose furnaces have, in consequence, been blown out. In Scotch the trade has been slow, and confined to consumers' immediate wants. The Glasgow market has steadily declined till the fall now aggregates 12/6 to 15/ per ton, Eglinton being now 91/ against 105/ a month ago. The steamer lines continue to monopolize nearly all the import of this article.

American Forge	currency,	$27·00 @ 30·00
No. 1 Foundry	"	34·00 @ 35·00
No. 2 Foundry	"	32·00 @ 33·00
Scotch No. 1 Foundry	"	38·00 @ 43·00
Import of foreign this month...tons,		3,852
Previously since January 1 .... "		4,190
Total to date .... "		8,042
Same time, 1873 .... "		7 752

BRITISH IRON MARKET.

(Specially reported by cable for The Iron Age.)

WEDNESDAY, March 4, 1874.

Scotch Pig.—A reaction from the recent steady decline has taken place, and prices are now about 2/ higher than the lowest prices touched last week. The demand is improving, and the amount of business has been large. The following are makers' prices:

Gartsherrie, No. 1	100/
Coltness, No. 1	102/6
Glengarnock, No. 1	98/
Eglinton, No. 1	93/

Manufactured Iron.—The market is dull, the demand small, prices weak, and little business doing. We quote Best Staffordshire Bars, £11. 10/ @ £13. 10/.

Rails.—The market is very dull. Demand is small and prices are nominal. We quote Welsh, £9. 10/ @ £10.

METALS.

Copper.—The demand for Ingot Copper continues to be very moderate, and the sales during last week did not amount to more than 150,000 lbs., at prices varying from 24¼c. @ 24⅝c. per lb. The closing quotations are 24⅝c. @ 25c. For future delivery there are no quotations, no transactions on that basis being reported. There is no speculative feeling in existence in the market at present, and the manufacturers do not seem disposed to buy largely. All the sales for the past week have been for cash or short time. For Manufactured Copper there is a moderate demand at the regular list established by the Copper combination, viz.: Braziers' Copper, ordinary sizes, over 16 oz. per square foot, 35c.; do., 16 oz. and over 12 oz., 38c.; do., 12 oz. per square foot and lighter, 41c.; Sheathing (14x48 inches), over 12 oz. per square foot, 33c.; do., 12 oz. per square foot and lighter, 41c.; Copper Bolts, 35c. Yellow Metal is in moderate request at the quotations of last week. Sheathing for vessels, 24c.; Sheathing, for reservoirs, 14 to 16 oz., 27c.; and Bolts, 32c., net.

Tin.—There is very little demand for Pig Tin, and prices are lower. Cable telegrams from London report a depressed state of the market there, and a very limited business. The latest quotations received from England are: Straits, £99 @ £100; L. & F., £105; and English Refined, £110. The sales for the week, in this market, are reported to be 35 tons of English L. & F. at 23c. @ 23¾c., part to arrive; 15 tons English Refined at 24¼c. @ 24¾c. The closing quotations are: Straits, 26½c. @ 27c.; Banca, 28½c. @ 29c.; Billiton, 26¾c. @ 27c.; L. & F., 25c. @ 23¼c.; English Refined, 25c., all gold. The demand for Plates continues very limited, but there is no quotable change in prices. The sales for the week comprise 500 boxes Charcoal at $11; 306 do. Charcoal Terne at $9·75; and 300 boxes Coke Tin at $8·25, all gold. In their circular of the 16th of February, Messrs. Sanders Bros. & Co., of London, referring to Tin Plates, say: "The spring trade has not, so far, developed itself very much, though a general inquiry can hardly now be very long delayed. No doubt, however, a proportion of the purchases made in December last at low prices for forward delivery were in anticipation of this. We may mention that many, if not most, of the Tin Plate workers are in daily anticipation of difficulties with their workmen, and will only enter orders for forward delivery subject to the usual strike clause. In regard to the future, fuel and Iron are cheaper now, and the drop in values of Tin, also, must tend to reduce cost of producing Tin Plates. We can hardly, however, anticipate any material reduction until existing engagements are more nearly run off than they are at present."

Lead.—There are no transactions in foreign Pig to report, and prices remain nominally as before, viz.: 6¾c. @ 6¼c., gold. About 75 tons of domestic Pig are reported as having been sold at 6¼c., gold. Bar, Pipe and Sheet are steady at 9 cents, less 10 per cent. to the trade. Tin Lined Pipe 16½c., same discount to the trade.

Spelter and Zinc.—There is nothing doing in foreign Spelter, and prices are entirely nominal. Western is being disposed of in small lots at 7¼c. @ 7½c., currency. There is a moderate demand for Zinc at our quotations.

Antimony.—There is a demand for Regulus in small quantities at from 13c. @ 13½c., gold, according to brand, but the business is very limited.

COAL.

During last week there was an eager demand for Anthracite Coal, in consequence of the publication of the official prices for the year by the Pennsylvania and Reading Coal and Iron Co., but the business is still considerably less than it has been for several years at the same season of the year. The sale of Scranton Coal, which we reported last week, and which showed a considerable reduction in price, as compared with the previous month, does not seem to have affected the regular market, and the list agreed upon by the combination continues to be well maintained.

The trade in Bituminous Coal remains very dull; prices are unchanged, and the quotations are as follows: West Virginia Cannel, $10 @ $15; do., Coking, $8 @ $9; Cumberland Soft, $7 @ $7·25; and Anthracite, $5 @ $6, by the cargo.

For foreign Coal the demand is very limited, and prices remain without change; the quotations are: For Liverpool House Cannel, $20; Liverpool Gas do., $11; Newcastle do., $8 @ $8·50; Scotch do., $11, currency.

From the latest accounts by mail from Wilkesbarre, Pa., we learn that, on the 2d inst. the miners, who have been for the last two months fighting the fire at the Empire Mine, near that city, ceased work, having become convinced that their efforts to control the fiery element were becoming more hazardous and unavailing each day. Subsequent events proved that their apprehensions were not unfounded, for this evening a most extensive "cave in" of the mine occurred, exceeding in extent the fall of the Baltimore mine, which took place a short time since. Great consternation prevails in the neighborhood of the mine.

The fire now has free scope, and threatens to ruin one of the most valuable possessions of the newly formed Wilkesbarre and Lehigh Coal Company.

OLD METALS, PAPER STOCK, &c.

There has been a fair demand during the last week for paper stock, and prices remain at about the rates quoted in our last. The few changes that have occurred will be found in our prices current. The dealers in Old Metals report a fair business, and no change to note, except a decline in the price of heavy Composition of about 1c. per lb. The dealers' purchasing prices are as follows:

Old Metals.—Copper, 18c. per lb.; Yellow Metal, 13c.; Brass, 13c. @ 14c.; Composition, heavy, 14c. @ 15c.; Lead, solid, 5½c.; Tea Lead, 5c.; Zinc, 4c. @ 5c.; Pewter, No, 1, 21c.; do. No. 2, 8c. @ 12c.; Spelter, 5c. @ 5½c.; Wrought Iron, 1½c.; Sheet do., ½c.; Cast, do., ¾c. @ 1c.; Machinery, do., 1¼c.

Rags, &c.—Canvas, Linen, 5c. @ 5½c.; do. Cotton, No. 1, 5½c. @ 6c.; No. 2, 2½c.; White, No. 1, 6½c.; No. 2, 4c.; Colored, do., 2c. @ 3c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 6c.; Gunny Bagging, 1¼c. @ 1½c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c. @ 3¼c.; Book Stock, 4c. Waste Paper and Scraps, 1½c.; Kentucky Bale Rope, 4c. @ 4¼c.; Oakum Junk, No. 1, 4½ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c.; Grass Rope, 3½c.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending March 3, 1874:

Hardware.

Boker Hermann & Co.
Packages, 20
Brantigam & Watson,
Wire, cs., 1
Beam & Murray,
Mdse. pkgs., 3
Dickinson Henry
Casks, 2
Frasse P. A. & Co.
Casks, 3
Field A. & Co.
Chains, cks., 19
Packages, 37
Herques & Co.
Rifles, bxs., 1
Hilger E. & Sons,
Casks, 3
Cases, 4
Mdse. pkgs., 1
Jones & Laughland,
Boxes, 1
King, Briggs & Co.
Chains, cks., 10
Cases, 2
Laughland & Co.
Wire, bxs., 1; bdls., 15; cks., 2
Lamarche H.
Arms, cs., 9
Lau & Gerlichs,
Arms, cs., 10
Moore's J. P. Sons,
Per. caps, cs., 7
Schuyler, Hartley & Graham,
Mdse. pkgs., 1
Strasburger, Pheiffer & Co.
Casks, 1
Sawyer John,
Wire rope, coils, 3
Schoverling & Daly,
Mdse. pkgs., 4
Packages, 3
Per. caps, cs., 3
Smith, Cohn & Co.
Anvils, 4
Tillotson L. G. & Co.
Galv. wire, lots, 147
Witte John G. & Bro.
Guns, cs., 2
Wiebusch F.
Chains, cks., 88
Anvils, 108
Casks, 8
Ward A.
Mdse. pkgs., 1
Order.
Chains, cs., 3; cks., 36

Iron.

Brown Bros. & Co.
Bars, 1781
Congreve Chas. & Son,
Rails, 959
Fish plates, bdls., 350
Hurst F. W. J.
Rails, 619
Henderson Bros.
Pig, tons, 400
Lennox E. L.
Bale ties, lots, 235
Laughland & Co.
Hay bands, bdls., 321
Lang W. Bailey & Co.
Bundles, 170
Morton, Bliss & Co.
Rails, 887
Phelps, Dodge & Co.
Bundles, 234
Wertheimber & Co.
Pig, tons, 150
Order.
Rods, bdls., 121
Scrap, bdls., 27; lots, 1

Steel.

Drexel, Morgan & Co.
Rails, 522
Jackson R. D.
Bundles, 173
Sanderson Geo. & Co.
Packages, 53
Order.
Cases, 12
Rails, 608

Metals.

Byrne Joseph,
Tin, slabs, 121
Tin plates, bxs., 1970
Bruce & Cook,
Tin plates, bxs., 1147
Tin, ingots, 150
Dickerson J. S. & Co.
Tin plates, bxs., 814
Antimony, cks., 46
Tin, ingots, 484
Darrel & Co.
Scrap, bbls., 4
Harley Geo.
Scrap copper, pkgs., 188
Naylor & Co.
Tin plates, bxs., 310
Phelps, Dodge & Co.
Tin plates, bxs., 8734
Antimony, cks., 40
Spring F. & Co.
Tin plates, bxs., 200
Order.
Tin and terne plates, bxs., 3437
Tin, slabs, 50; ingots, 889
Antimony, cks., 25
Lead, pigs, 2079

PHILADELPHIA.

PHILADELPHIA, March 3, 1874.

The Iron market continues devoid of vitality, with scarcely enough doing to mark prices. In Pig Iron there is some little inquiry for Forge Iron, but at prices from $2 to $3 below the views of furnace companies, which are not anxious to sell at prices offered. The future of the market seems to be extremely uncertain, and those best posted in the trade express themselves entirely at a loss what to think. The only redeeming feature appears to be the Rail trade, the mills of which are generally starting up on orders, and in the market for Pig Iron. There is nothing new reported in the status on the Lehigh, the Crane furnaces are still out, and with the present prospect of the market there is no inducement to blow them in. The bar mills are very quiet, and cannot, mill men complain, pay the price asked for Forge Pig at present rates of Bars. Scrap is slightly lower but continues in strong request. The following are the current quotations, but are entirely nominal as little or no business can be done in the existing state of feeling at these rates:

PIG IRON.—No. 1 Foundry, $34 to $35; No. 2, $32 to $33; Gray Forge, $28 to 29. White and Mottled, $25 to $26.

BARS—3c. to 3·1c. per lb.

RAILS—$63 to $65, at works.

OLD RAILS—$38 to $40.

SCRAP—$38 to $40, the latter for choice selections. The sales which comprise only purchases for the necessities of consumers, and serve to mark prices, include 100 tons Gray Forge Red Short Iron at $28 at furnace; 200 tons Susquehanna, Mottled Iron, at $25 at furnace; 100 tons Scrap at $40; 500 tons Rails at $63, at works, and 1500 tons same on private terms, with some orders for considerable lots offering at less than quotations.

Messrs. BLAKISTON & COX, under date of March 2, write us as follows: Since our last report there have been few transactions in any branch of Iron manufacture, save in American Pig a sale of 500 tons Mottled and White, and in new American Rails of 300 tons. The marked apathy which has prevailed among buyers has given place to a spirit of inquiry, and an acknowledgment by consumers that their stocks of raw material are small, and the time for replenishing is undoubtedly near. Consumers who thought they had no business and no prospects of any, and therefore would need no Iron, now find their prospects brighter, and are negotiating for material. There is no change in the situation of affairs on the Lehigh in regard to the labor troubles. The decided stand of the Crane Co. has prevented any further outbreak, and for the present all is quiet. A brisk demand for Iron would probably result in a general increase of wages. The makers of Pig Iron and mill proprietors are generally firm in their views of prices, although some are offering to sell at reduced figures. It is probable that as the spring opens business will improve. We quote: *American Pig*—No. 1, $35; No. 2, $33; Gray Forge, $30; White and Mottled, $27; and here, No. 1 *Scotch Pig*, $43 for Eglinton and $44 for Glengarnock. Bar Iron sells at 3 2 10 cents at the mill. New American Rails are quoted at $63 to $65 at the mill, and Old Rails at $41, nominal. No. 1 Wrought Scrap is held at $37, and No. 1 Cast do. sells at $25 to $27.

PITTSBURGH.

PITTSBURGH, Feb. 28, 1874.

PIG IRON.—There has been no improvement in the pig iron trade during the past week, and the market is weak with a drooping tendency, while the demand is confined entirely to supplying immediate wants. Gray Forge Irons may be fairly quoted at $29, cash, and $30, 4 months, showing a decline since my last report of one dollar per ton. It is true there are some producers who, for the time being, are unwilling to sell at quotations, but consumers have no difficulty in obtaining all they want at the reduced rates. It would perhaps be difficult to obtain anything like a round lot of say 1000 or 2000 tons of standard open Red Short at the prices named, yet it would probably be almost, if not altogether, as difficult to find a buyer as a seller. There seems to be a general disinclination on the part of the trade to make new engagements for the present, in consequence of the uncertainty of the action of Congress in regard to the currency question, and while the general feeling here among iron men, as well as manufacturers generally, is favorable to expansion, it is earnestly desired that some disposition of the matter should be made as soon as possible, so as to enable people to shape their business accordingly. It is this uncertainty that causes the depression that is now prevailing in the iron trade, and it is not likely that there will be any decided improvement until the financial policy of the government has been fully and finally decided upon. Foundry irons continue very dull, and there is scarcely enough doing to establish quotations. No. 1 may be quoted nominally at $34 @ $35, 4 mos.; No. 2, $30 @ $33; White and Mottled, $27 @ $29. Blooms also dull and nominal at $85 @ $100, according to quality.

MANUFACTURED IRON.—The market continues fairly active, and notwithstanding orders are not coming as freely and the demand is not as urgent as it was a month ago, the mills are reported as having about all they can do, many of them running to their full capacity. There was a meeting of the Iron Association on Thursday last, at which the situation, both present and prospective, was fully canvassed, and the feeling generally was favorable to a large spring and summer trade. It seemed to be generally conceded that there was scarcely sufficient margin at present rates, but it was deemed impolitic to make any change whatever in the card for the present.

NAILS.—There is no abatement in the demand for Nails. Orders continue to flow in freely, and while there has been no change in rates, the market is very stiff, with indications of an early advance. A meeting of the association took place, at which there were several representatives from Wheeling, and it is understood that the latter are anxious to put up prices immediately. Four dollars, net, is the selling rate for 100 keg lots and upward, with the usual discount of two per cent. for cash. A heavy spring trade is considered about as certain as anything can be in this world.

STEEL.—The mills continues fairly active and is steadily improving; and while the mills, as a rule, appear to be busy, some of them working to their full capacity, none of them are refusing orders. However, it is confidently expected that there will be a good spring trade, although it has not thus far been as brisk as some of our manufacturers had counted upon. There has been no change whatever in the card for several months.

WINDOW GLASS.—The outlook continues to improve slowly, and it is expected that the most of the factories will soon be in full blast again. Schmertz & Co. have started up both of their factories, the blowers consenting to go to work at the reduction, and it is understood that J. McKee & Co. have rented their works to their blowers, and have agreed to furnish them with sufficient capital to run the business at the rate of 6 per cent. Most of the Flint Glass and Bottle factories have resumed.

COKE.—This important interest continues in a very unsatisfactory and somewhat depressed condition, but it is hoped there will soon be a reaction for the better. The miners and drawers in the Connellsville district, at last accounts, were on a strike for an advance of some 15 to 20 per cent. in wages. Manufacturers say they cannot afford to pay the advance, for the present at least, and the result will probably be a general suspension.

COAL.—This important Pittsburgh interest is also very much depressed, and, what is worse still, there does not seem to be much prospect of an early improvement. The Ohio River has been in navigable condition nearly all winter, and the down river markets, from Cincinnati to New Orleans, are all glutted, and prices are ruinously low. The shipments within the 10 days have been over 5,000,000 bushels by river.

The Pittsburgh *Commercial*, of February 28, says: The market for Pig Iron remains about the same as at date of last report, with no quotable change in prices. There is but little

inquiry, and consequently but limited sales, the only two of any consequence being a lot which was offered a little below the market price. We are reported the following sales:

BITUMINOUS COAL SMELTED FROM L. S. ORE.

800 tons Mill Iron	$30·00—4 mos.
400 tons Gray Forge, red short	30·00—4 mos.
160 tons Gray Forge, red short	31·00—4 mos.
140 tons Gray Forge	29·00—cash.
86 tons Silvery	28·00—4 mos.
20 tons clear Gray Forge, Mottled and White	29·00—4 mos.
20 tons No. 1 Foundry	33·00—4 mos.

CONNELLSVILLE COKE.

100 tons Mill Iron	$31·00—4 mos.
60 tons White and Mottled	28·00—4 mos.
40 tons Mill Iron	30·00—4 mos.

CHARCOAL, EASTON.

40 tons No. 1 Cold Short	$50·00—4 mos.

ST. LOUIS.

Messrs. GARRETT, McDOWELL & Co., under date of 28th inst., send us the following: The Pig Iron market continues inactive. No change in prices; and we repeat our last quotations.

HOT BLAST STONE COAL

No. 1 Foundry, from Iron Mountain and Maramec Ores	$31·00 @ 35·00
No. 2 Foundry, from Iron Mountain and Maramec Ores	32·00 @ 33·00
No. 1 Forge, from Iron Mountain and Maramec Ores	29·00 @ 31·00
No. 1 Foundry, Massillon, O	43·00 @
No. 1 " Tennessee Cold Short	36·00 @
No. 1 " Ohio Cold Short	40·00 @

HOT BLAST CHARCOAL.

No. 1 Foundry, from Iron Mountain and Maramec ores	36·00 @ 43·00
No. 2 Foundry, from Iron Mountain and Maramec Ores	32·00 @ 40·00
No. 1 Foundry, from Tennessee ores	35·00 @ 37·00
No. 1 Forge, " " "	31·00 @ 33·00

COLD BLAST CHARCOAL.

Car Wheel, from Hanging Rock Ores	60·00 @ 64·00
" " Tennessee Ores	58·00 @ 60·00

CINCINNATI.

Messrs. ADDY, HULL & Co., under date of March 2, write us as follows: The market continues without activity in any grade. There has been some little inquiry for Car Wheel Irons at prices largely below present quotations. Hanging Rock Charcoal brands remain moderately firm at inside quotations. Forge Irons are in light demand. Prices nominal.

HOT BLAST CHARCOAL.

Hanging Rock No. 1	₱ ton $38·00 @ 40·00—4 mos.
" " No. 2	35·00 @ 37·00—4 mos.
" " Forge	30·00 @ 32·00—4 mos.
Tennessee No. 1	37·00 @ 38·00—4 mos.
" Forge	30·00 @ 32·00—4 mos.
Alabama No. 1	38·00 @ 40·00—4 mos.
Missouri No. 1	38·00 @ 40·00—4 mos.
" No. 2	35·00 @ 37·00—4 mos.

HOT BLAST STONE COAL.

Missouri No. 1	₱ ton $37·00 @ 38·00—4 mos.
" Forge	30·00 @ 32·00—4 mos.
Ohio No. 1	35·00 @ 37·00—4 mos.
" Forge	30·00 @ 31·00—4 mos.
Scotch Pig, No. 1	

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel	₱ tn. $60·00 @ 66·00—4 mos.
Missouri " "	58·00 @ 60·00—4 mos.
Kentucky " "	55·00 @ 60·00—4 mos.
Tennessee " "	55·00 @ 60·00—4 mos.
Georgia " "	55·00 @ 60·00—4 mos.
Alabama " "	55·00 @ 60·00—4 mos.
Machinery and Forge	55·00 @ 57·00—4 mos.
Blooms	105·00 @ 116·00—1 mos

LOUISVILLE.

MR. GEO. H. HULL, under date of March 2, writes us as follows: The market is dull for all grades of metal, and prices are unchanged. The usual time, four months, is allowed on quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$40·00 @ 41·00
" 2 " " " "	35·00 @ 37·00
" 1 Forge, " " "	32·00 @ 33·00
" 1 F'dry, from Tennessee Ores	35·00 @ 40·00
" 2 " "	34·00 @ 37·00
" 1 Forge, " "	30·00 @ 33·00
" 1 F'dry, from Alabama Ores	36·00 @ 40·00
" 1 " " Iron Mountain Ores	41·00 @ 43·00

HOT BLAST STONE COAL.

No. 1 F'dry, from Missouri Ores	35·00 @ 37·00
" 2 " " " "	32·00 @ 34·00
" 1 Forge, " " "	30·00 @ 32·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	60·00 @ 65·00
" " Tennessee Ores	55·00 @ 56·00
" " Alabama Ores	58·00 @ 60·00
" " Georgia Ores	58·00 @ 60·00
" " Missouri Ores	55·00 @ 60·00
" " Kentucky	55·00 @ 60·00

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, reports us the following prices under date of March 3, 1874: Since our last report the demand for Manufactured Iron has been of a languid character, and prices ruling in favor of buyers. Quotation figures remain unchanged throughout the list, with the exception of Horse and Mule Shoes, in which we note an advance of ¼c. per lb., and now quote same at 5¾c. for Horse, and 6¾c. for Mule.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ⅜ to 1 thick	3¼c. to 3½c. per lb.
1 to 4½ wide by 1½ to 2 thick	" " "
Round and square, ordinary sizes, from ⅜ to 2 inclusive	3½c. to 3¾c. "
Hoop Iron, 1½ wide and upward	4¼ to 5c. per lb.
Band Iron, from 1¾ to 4 in. wide	4 to 4¼c. "
Horse Shoe Iron ⅜ to 1 wide by ⅜ to ½ thick	5·87½c. "
Norway Nail Rods	7¾ to 8 c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	16¼c. "
Machinery Steel	11¼c. "
Cast Spring Steel	11c. "
Homogeneous Steel Plate	18c. "
Perkins' Horse Shoes, per keg of 100 lbs	$5·87½
" Mule Shoes " "	6·87½

Common Horse Nails, from 14c. to 18c per pound.

	10	9	8	7	6	
Putnam Horse Nails	23	24	25	26	28c.	per lb.
	10	9	8	7	6	
Globe Horse Nails	23	24	25	26	28c.	per lb

R. R. Spikes 5¼ by 9-16 at 3¾c. to 4c. per lb.

BOSTON.

BOSTON, Feb. 28.—There is no improvement in the demand for Refined Bar Iron. Sales continue to be made in round lots from first hands as low as $70. Sales from store are made in the range of our quotations. The market is dull. Boiler Plates are a little firmer. Nails are selling fairly at the recent reduction. Pig Iron is very quiet, but prices of American are steady. Scotch is nominal. We quote yard lots of American Pig Iron at $35 to $40 per ton, including No. 2 extra at $36 to $38, and No. 1 at $39 to $41. We quote Eglinton at $45, Coltness at $49, Charcoal at $50 to $60. American and English Refined Bar Iron is selling at $72·50 to $83 per ton for the ordinary sizes, and $88 to $92 for extra sizes, according to size. Cast Steel is selling at 16c., gold, for English, 18c., currency, and 14c. to 15½c. for American, currency, with fancy brands of English selling at 17c., gold. Anchors are selling at 8½c. per lb.; Chain Cables (⅝ to 2 inches thick), 7c. to 8¾c. per lb.; Coil Chains, 7¼c. to 16c. from 3-16 to 1¼ inches. We quote Boiler Plates at 6¾c. to 7½c. for Flanges, 4¾c. to 5c. for C No. 1, and 4¼c. to 4½c. per lb. for Common and Tank. Russia Sheet is selling at 18c., gold, and 20c., currency, for perfect lots. English and American are selling at 6¾c. to 8¼c. per lb. currency. We quote Galvanized Sheet Iron, No. 20, at 11c.; Nos. 21 to 24, 12c.; 25 and 26, 13c.; 27, 14c.; 28, 15c. Nails are selling at $4·25 for 10d to 60d, and other sizes at a range of $4·50 to $8·25 per 100 lbs., less discount of 15c. per keg to the trade on 100 keg lots. Horse Nails, 28c. No. 7.—*Commercial Bulletin.*

FOREIGN.

GREAT BRITAIN.

Messrs. J. Berger Spence & Co., London, Glasgow and Manchester, under date of Feb. 14, 1874, report:

Metals.—This market continues almost exceptionally dull; and although some portion of the quietness may naturally be credited to the effect of the electoral contests, now nearly over, it is hardly expected that their conclusion will induce a resumption of that activity which we have experienced for the past two years, and many are inclined to believe that still further reductions must take place in our staples before we can hope again to enjoy a steady and healthy trade. A considerable fall has taken place in the value of Scotch Pig Iron warrants; and makers' Iron has also been reduced. The shipments for the past week are returned as 7393 tons, against 10,537 tons in the corresponding week of last year. In the Cleveland district there is little doing, and Iron can be obtained more freely, and on terms favorable to the consumer. The demand for Manufactured Iron is very quiet, and few of the works are working up to full time, and many makers of second class brands have again had to submit to a further lowering of their quotations. Copper is lower, and the demand not up to the average, either for Chili Bars or English Tough and Manufactured. The charters from the West Coast for the first fortnight in this year are cabled as amounting to 1700 tons. A drop has taken place in Tin, but the market is now a little steadier. Lead is in fair inquiry, and there does not appear much disposition either on the part of buyers or sellers to press business. Spelter is very quiet.

IRON.—"Ayresome" Yorkshire Pig Iron, No. 1, 95/; No. 2, 90/; No. 3, 87/6; No. 4 (Foundry), 85/; No. 4 (Forge), 85/ net cash, or 2/ extra 4 months' bills. Scotch Pig warrants, 95/ to 97/6. Staffordshire Bars, £12 to £14. Hoop Iron, £13. to £14. Gas Tubes, 52½ per cent. off new list. Boiler Tubes, 30 per cent. discount.

COPPER.—English Tough Ingot, £90 to £92. Chili Bars, £79 to £80.

TIN—English Ingot, nominal, £110 to £112. Straits, £107 to £108.

TIN PLATES.—Best Coke, I. C., 28/ to 30/; Charcoal, I. C., 34/ to 36/ per box.

LEAD.—Best English Soft Pig, £23 to £23. 10/. Refined Red Lead, £26 to £27.

ANTIMONY.—French Star, £53 to £54.

SPELTER.—Silesian. £25 to £25. 10/. English, £26 to £27.

FRANCE.

(*Moniteur des Interets Materiels.*)

PARIS, Feb. 15, 1874—*Iron*—Iron industry is suffering a great deal, work is lessening, and the number of operatives out of employment is daily on the increase. There are signs, however, that some revival will take place in the spring. Inquiries about prices from large consumers are more frequent, our government has in preparation some extensive works to be performed, and several lines of railways will finish branches long deferred, aside from which the season approaches when the ship yards will once more be busy. All these elements combined can hardly fail to bring about a favorable change. The custom house returns for 1873 show an import into France of 131,309 tons of Pig and Scrap Iron, against 134,303 in 1872; of Wrought Iron, Sheet and Steel, 49,466, against 42,210. Our export has been 284,281 tons, showing a decrease of 20,000 tons. Of Iron Ore we imported 720,518 tons, and exported 352,853. We imported, included in the foregoing figures, 267,000 tons from Algiers, 175,000 from Spain, 123,000 from Italy and 120,000 from Belgium. Of our export, Belgium took 174,560, and Germany 163,500 tons. *Copper*—Nothing of special interest has occurred. There is little doing, and prices have varied but slightly in Europe during the past week. London has been but feebly supported, the elections absorbing public attention. Best Selected, £90 to £92. Paris is in a languishing condition at 215 francs for Chili Bars deliverable at Havre; Havre also paralyzed. Marseilles unaltered. The German markets are all weak. English at Berlin, 30 to 31 thalers. Stettin steady at 31 to 32. *Tin*—This metal has been very irregular in quotations, in England in particular, where the failure of a leading Tin holder, at a time when the elections were in full swing, has weighed heavily on prices. Straits are £107 to £107. 10/ per ton, a recovery from £106. 10/. Paris has undergone a decline of from 5 to 15 francs. Banca here or at Havre, 310 francs. Havre has borne up but indifferently against the downward course, while Marseilles has done so more successfully. Holland has been carried away in the same direction by the news from London regarding the great tin failure. Nothing doing in Germany and prices nominal. Berlin, 41¾ to 41¾ thalers; Stettin, 42½ to 43; Penang, per cable, 5th instant, down to $30 per picul. *Lead.*—The European Lead markets are still in great confusion, little doing, yet no decline of note. English smelting establishments try to uphold the value of the domestic article, but are baffled in their endeavors by the lower offerings of Spanish, from 30 to 40 shillings per ton cheaper. Here, at Paris, consumers operate with great circumspection, and only buy from hand to mouth at between 58 and 59 francs here, and deliverable at Havre. At Amsterdam, Stolberg is 14¾, and Spanish, 13⅞ guilders. Berlin is weak at between 7¾ and 8¼ thalers. Stettin is 8¾ to 8¾ for Tarnowitz, and 8½ San Andres, Spanish. *Spelter* is difficult to judge just at present, as regards the immediate future, London being inactive. Paris has declined between 2 and 2½ francs, without leading to more business. We quote Silesian here and at Havre, 65 francs. Germany is weak, Breslau W. H., 8 11-12 thalers; Berlin, 9¼ to 9¾, and Stettin 9¾, nominally. *Coal.*—Coal in France is quiet and unchanged. The recent cold has not improved values, on the contrary, the tendency remains a downward one.

BELGIUM.

(*Moniteur des Interets Materiels.*)

BRUSSELS, Feb. 14, 1874.—*Iron.*—The calamitous crisis which is weighing down Iron industry in Belgium has undergone no modification. The difficulty has not to be searched for solely any more, as has been the case hitherto, in the high price of coal, but rather in the unfavorable position in which railroad interests are placed in our country. They have been under a load of extra expenses during the past year, especially the enhanced cost of coal, and they have now been reduced to a forced system of economy; the old rolling stock, however much worn out it may be, is kept in the same state, and rails, which, under ordinary circumstances, would be replaced by new ones, are left untouched. The misplaced parsimony thus indulged in seems to us more costly than a liberal policy of well-timed repairs; accidents will be of greater frequency, and damages will be entailed. The Iron market is listless, and quotations are nominal. *Coal.*—At length there has been a fair test put upon the present value of Coal on the occasion of awarding a government contract upon tenders, the result being a decline of 50 per cent. upon the previous government award for the same descriptions of Coal of the 19th June, last year. Although we have been predicting a great decline for the past six or eight months, we did not expect a drop like the one here put on record. This opening of tenders shows the demoralized condition in which the market has been for months past, and proves that we are at length landed at the same level of November, 1871, whence the first upward movement was started. Liege had been offering a lower average at these tenders than Charleroi.

LATEST EUROPEAN TIN TELEGRAM.

LONDON, March 3, 1874.—Straits Tin declined to £97.

AMSTERDAM, March 3, 1874.—Banca Tin declined to 62 guilders.

HOLLAND.

(*Wm. Brummer, Schroder & Co.*)

ROTTERDAM, Feb. 14, 1874.—The Tin market is dull. Banca, auction paying conditions, "spot," as well as deliverable from the coming March and May sales, has been sold at 65 guilders and "spot" Billiton at 64¼ guilders.

EAST INDIES.

(*Gilfillan, Wood & Co.*)

SINGAPORE, January 14, 1874.—Tin has declined to $31·75 per picul, at which a large business has been done, both for England and the United States.

(*Aitken, Spence & Co.*)

COLOMBO (Ceylon), January 21, 1874.—*Plumbago.*—The market continues very quiet, and prices are gradually on the decline. Considerable shipments are still being made to London, but the rate of freight is easier, showing a falling off in the demand for tonnage. Shipments to date are 2530 tons against 1701 tons same period last year. Total shipments to the United States 18,067 cwts., from Oct. 1, 1873, to date, of which the Imogene, which cleared 16th instant for New York, took 2887. Calculating Exchange at 2/ the rupee, the following is the quotation, free on board, with commission: Clean, 360/ to 388/6 per ton; Chip, 180/ to 199/6, and Dust, 80/ to 98/6. Freight to London, 67/6.

(*Dammier & Co.*)

BATAVIA (Java), January 8, 1874.—*Iron.*—A considerable transaction of Swedish Iron at 17¾ guilders per picul, six months' credit, has taken place. Of English no sales have been reported, and prices are nominally unchanged. In Coal there is nothing doing.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(*From our Regular Correspondent.*)

SHEFFIELD, Eng., February 17, 1874.

THE SCOTCH IRON TRADE.

This usually active market is just now as feeble as that Helen was fickle who cost the Trojans so much "blue blood," and at the time of writing I see no signs of improvement. The usual cablegrams will have given you very timely and, I should imagine, opportune intimation of the great fall in makers' prices, which you will readily have known to have been accompanied by a drop in warrants. These, at present, are quoted about 95/ to 96/3, with no great amount of business doing. Makers' prices are, as nearly as possible, those given in my cablegram, but there is so great an irregularity in the prices of the same classes of iron that I deem it better not to give them in detail this week. It may, however, be taken as an undoubted fact that sellers are giving way in all directions in order to effect sales. Gartsherrie and Coltness have probably felt the drop less than other brands. Shipments last week were on a somewhat larger scale than the previous one, but there is still a great falling off when compared with the corresponding week of 1873. On the other hand, imports of Middlesboro' pig into Scotland are increasing, the difference in prices easily accounting for the fact. The manufactured iron trade of Glasgow is pretty well employed, but competition is close and the demand is not large enough to allow of business being turned over with more than a minimum of profits.

OTHER IRON DISTRICTS.

These are mostly but indifferently employed. At Barrow-in-Furness the rail mills are running mainly on old American and Canadian contracts. The latter have been very large, but are becoming pretty well exhausted unless—which is probable—a further order is given out by the Grand Trunk people. The Middlesboro' district is stagnant. Few of the rail mills are running above half time, and the pig iron producers are suffering from a lethargic market and an accumulating stock in all directions. Longing eyes are turned to Russia by the iron masters, and hopes are freely expressed that the Great Bear will order extensively as soon as the shipping season opens up. At Sheffield the iron trade is in much the same condition as when last alluded to. Such changes as have occurred are of little real moment, so that I shall not occupy my space by a record of mere *bagatelles.*

THE STEEL TRADE

is quiet. None of the works are making more than three to four and a half days a week, and but few of the firms acknowledge having received an accession of orders worth mentioning. The principal establishments are certainly doing a steady stroke in cast and tool steel of specific qualities, but they are altogether exceptional, and cannot fairly be taken to represent the steel trade as a whole. Some interest has been centerd in the published extracts from the Boston *Journal of Commerce*, and also in communications from importers and agents at New York, Boston and Philadelphia, as to the proposed substitution of a specific duty for the *ad valorem* one. It would be idle for me to say in which direction the Sheffield manufacturers throw their influence and wishes—it is, indeed, self evident.

CUTLERY

is still extremely inanimate in almost every branch, save that I hear of a somewhat better inquiry for high class table knives, razors and fancy cutlery. Some part of this augmented inquiry proceeds from your side of the water, and it is, perhaps, worth mentioning that some of the merchants here are confidently looking forward to a brisk spring trade with the States in certain classes of goods. I am bound to say, as a mere opinion, that the tenor of advices from your great industrial centers does not wholly confirm their sanguine expectations, but, on the other hand, they do not entirely contradict the supposition, and almost uniformly state that stocks are very low.

THE PRICE OF SHEET IRON.

A special meeting of the Ironmasters' Association of South Staffordshire and East Worcestershire, was held at Wolverhampton on Friday, to consider the report and resolutions (see my last letter), adopted at the meeting of the sheet iron manufacturers of Great Britain, which report suggested great advances in the current list of prices for all kinds of sheet iron. The ironmasters decided that they could not accept the report and resolutions in their entirety, and a further report will therefore be prepared and submitted. There can be no doubt that sheet iron will be advanced very considerably.

BIRMINGHAM AND DISTRICT.

Trade is very quiet, still most of the hardware branches are doing moderately well. Some few export orders have come in from Canada, Russia, Sweden, India and Germany, but in the main makers are yet relying chiefly on the home market. The tin plate workers and japanners, wire drawers, lamp makers and metal rollers are fairly busy, and the jewellery, saddlery and small arms branches do not lose time for lack of orders. The iron trade of the district, including South Staffordshire, is in a state of pure inanition, and in no case are the men making more than an average of three days per week. Common iron is much depressed, and prices are weak, yet the list price best bars is maintained at £14. Galvanized sheets are, as a rule, quoted the full 50/ higher—as per advance agreed upon a fortnight ago—but no business worth recording is being done on those terms. In other respects there is no alteration.

SOUTH WALES, WORCESTERSHIRE AND MONMOUTHSHIRE.

The ironworks of South Wales are not yet fully engaged. Rails are quoted £10 to £10. 15/, but nothing out of the ordinary way is being transacted. A cargo or two of rails were last week sent to Santos and Madras. Russia is here, as in the other districts, the sheet anchor, which has not yet been "let go." The Worcestershire pig iron makers have dropped common pig 2/6 to 5/ per ton. The wire works are fairly well engaged, as also are the principal ironworks of Monmouthshire. There is no great amount stirring in tin plates, save a few orders for exports to the States.

METALS.

Metals are quiet, and dull all round. Subjoined are two merchants' reports. Messrs. Von Dadelzen & Co. say: The metal market has again been very dull, and prices generally lower. *Iron.*—The state of the trade is still very unfavorable. Scotch pig iron has again fallen from 101/ to 93/6, closing at 95/. The shipments last week were 7503 tons, against 10,537 tons for corresponding week, 1873. Copper again lower, and the feeling is bad. Chili sold at gradually falling prices, from £81. 10/ to £79. Wallaroo sold as low as £89; Burra at £88 to £88. 10/. *Tin.*—The fall continues; Straits has declined rapidly from £113 to £105 for immediate delivery, while a sale to arrive was reported at £102. 10/, but there has been some recovery at the close, £107 having been reported paid for immediate delivery. The value for tin afloat and for forward delivery quite nominal. In Holland, Banca has fallen from 67½ fl. to 65 fl., and Billiton from 66¼ fl. to 64 fl. The only transaction in a Banca reported here was 500 slabs, at £112. 10/. It is impossible to quote a price for English tin. Smelters have again reduced the standard privately. Small sales reported at all prices, from £105 to £109. Tin plates firm. Lead still uncertain, about £23 to £23. 10/. Spelter rather better; £25 to £25. 10/ for ordinary brands.

Messrs. James & Shakespear say, under date Feb. 14: *Copper.*—The Swansea ticketing of 10th inst. averaged 14/9¾ for 17½ per cent. produce; by private contract, 200 tons each, Chili ore and regulus, realized 15/6 and 16/ respectively. Metal has fallen during the week about £2 per ton, and except at or near the lowest rates very little business was done. The purchases were almost entirely restricted to Chili bars, the whole of which were taken on cash terms from £81. 10/ down to £79 per ton for good ordinary brands, including Lota and Urmeneta. Australian sorts were neglected, and a few transactions only reported down to £88 for Burra, £89 for Wallaroo. The full Chili telegram is not yet to hand, but a message came on Tuesday last giving the charters for the first half in January at 1700 tons pure, without any further details. *Tin.*—English has receded 5/ to 6/, and is only in moderate request at the present date. Foreign sorts were comparatively steady until Monday last, on which day holders evinced a strong desire to realize, causing thereby a sudden drop in prices of fully 6/ per cwt.; since that date values have been very irregular, and it is, therefore, almost impossible to give exact quotations. The sales consisted almost entirely of Straits, at figures ranging from 112/ down to 105/, cash; 109/ to 102/6 for arrival per steamer; and 107/ to 105/ for forward delivery; a moderate quantity of Australian selling from 109/ to 104/, cash. Spelter is entirely neglected, and could not be sold except at very low prices.

Soldering Iron and Steel.

As it is often necessary in manufacturing operations of different kinds to unite iron and steel by other means than welding, the following practical hints, which we translate from *Wiederholds' Gewerbeblatter*, will be found worth remembering:

For large and heavy pieces of iron and steel, copper or brass is used. The surfaces to be united are first filed off, in order that they may be clean. Then they are bound together with steel, and upon the joint a thin strip of sheet copper or brass is laid, or, if necessary, fastened to it with a wire. The part to be soldered is now covered with a paste of clay, free from sand, to the thickness of one inch, the coating being applied to the width of a hand on each side of the piece. It is then laid near a fire, so that the clay may dry slowly. The part to be soldered is then held before the blast, and heated to a white heat, whereby the clay vitrifies. If iron is soldered to iron, the piece must be cooled off in water. In soldering steel to steel, however, the piece is allowed to cool slowly. The semi-vitrified clay is then knocked off, and the surface is cleaned in a proper manner. By following the hints given, it will be found that a durable and clean soldering is obtained. If brass, instead of copper, is used, it is not necessary to heat so strongly; the former recommends itself, therefore, for steel. Articles of iron and steel of medium size are best united with hard or soft brass solder. In both cases the seams are cleanly filed and spread over with the solder and borax, when the soldering seam is heated. Hard brass solder is prepared by melting in a crucible eight parts of brass, and adding one part of previously heated zinc. The crucible is then covered and exposed to a glowing heat for a few minutes, then emptied into a pail with cold water, the water being strongly agitated with a broom. Thus the metal is obtained in small grains or granules. Soft brass solder is obtained by melting together six parts of brass, one of zinc, and one of tin. The granulation is carried out as indicated above. Small articles are best soldered with hard silver solder or soft solder. The former is obtained by alloying equal parts of fine silver and soft brass. In fusing, the mass is covered with borax, and, when cold, the metal is beaten out to a thin sheet, of which a sufficiently large and previously annealed piece is placed with borax upon the seams to be united and heated. Soft silver solder differs from hard silver solder only in that the former contains one-sixteenth of tin, which is added to it during fusion. Very fine articles of iron and steel are soldered with gold, viz., either with pure gold or hard gold solder. The latter can be obtained by fusion of one part gold, two parts silver, and three copper. Fine steel wire can also be soldered with tin, but the work is not very durable. Hard and soft brass solder are used for uniting copper and brass to iron and steel, silver solder for silver, hard gold solder for gold.

New Method of Lighting Gas.

A novelty in gas lighting apparatus has been tested on the street lights of Preston, England, with satisfactory results. The apparatus is described as resembling a small globular inkstand of glass, surmounted by a tube of the same material, with a metallic top; and by screwing off the burner it can be very easily attached to any lamp, chandelier pipe, or ordinary gas jet. The base or globular portion is filled with a deep red colored liquid—a simple chemical mixture with no combustible properties, almost without smell, and so cheap that threepenny worth of it will serve one lamp for 12 months. Over this liquid, and within the glass tube, there is a plate of zinc, with a piece of graphite or gas coal, and between these and a thin coiled platinum wire, fixed over the cap of the general vessel, into which a gas burner is inserted, galvanic communication is obtained. Ignition is effected in the following way: A pipe, to be screwed to that up which the ordinary gas supply flows, runs through the base of the vessel to about the center of the surmounting tube; pressure brought to bear upon the gas in this pipe causes, by small collateral openings, a simultaneous depression upon the chemical solution which occupies a lower level in two side tubes; the gas occupies the vacuum caused by the displaced liquid, and then ascends to a chamber in connection with the burner, while the displaced liquid is pressed into two side tubes, effecting contact with the zinc and graphite, generating galvanic activity, which is communicated to the platinum wire, and exciting the catalytic power of the wire, which, when exposed to the ascending jet of gas, results in immediate, almost instaneous, iguition. The mechanism is of the simplest construction, and can be applied to any kind or number of gas pipes, either remote from or proximate to the works, to street as well as to office or shop lamps, and the light can be extinguished as quickly as it can be ignited.

Plastic Carbon for Filters.—According to Prof. Kletzinsky, two mixtures have been found best adapted to this purpose in practice—the one consisting of 60 parts of coke, 20 of animal carbon, 10 of charcoal and 10 of pipe clay; the other of 10 parts of coke, 30 of animal carbon, 20 of charcoal and 40 of short fibred asbestos. The ingredients, except the asbestos, are finely powdered, passed through a sieve, and intimately mixed while dry, and then mixed with as much molasses or syrup as may be necessary to form a plastic mass, about as much as the weight of the dry powder. This dough is well worked, and then formed into cylinders or discs, allowed to dry for some time at a moderate temperature, and then burned in a carefully heated muffle, without access of air. After being slowly cooled, the soluble salts are extracted, and the sulphide of iron decomposed, by placing the article in very dilute hydrochloric acid. The filter is then thoroughly washed in running water, dried, and again heated to dull redness, in a well closed muffle, and finally shaped, by turning, as may be desired, for beakers, funnels, etc. Closed hollow vessels can be formed by luting together two suitably shaped vessels of the substance by means of a certain paste. This is prepared by covering the turnings from the washed masses, thinly, with pure syrup (made by dissolving refined sugar in half its weight of water), and triturating them. The edges of the vessels to be luted are first well fitted together, and then coated with the paste, so as also to fill all the seams; and the whole, after drying thoroughly, is to be burned at a dull red heat. While the fused sugar carbon affords a vitreous mass, the asbestos and coke and coal give firmness and form the framework. The charcoal removes especially fusel oil and odorous gases, and the nitrogenous animal carbon extractive and coloring matter. Tubes of different materials can be firmly cemented to the filters by plastic sulphur or good cement, such as is made with chalk, clay and water glass.

London Metal Market.

(*From The Mining Journal.*)

	£.	s.	d.	£.	s.	d.
Copper—₱ ton.						
Best Selected	83	0	0	91	0	0
Tough Cake & Tile	88	0	0	90	0	0
Sheathing and Sheets	95	0	0	96	0	0
Bolts	100	0	0	101	0	0
Bottoms	99	0	0	101	0	0
Old	85	0	0	—		
Burra Burra	88	0	0	—		
Wire	₱ lb.	0	1	0½	—	
Tuyes	"	0	1	0½	0	1 1
Brass—₱ lb.						
Sheets		0	0	10	0	0 11
Wire		0	0	10½	—	
Tubes		0	0	11½	0	0 11½
Yellow Metal Sheathing		0	0	8½	0	0 8¾
Sheets		0	0	8½	—	
Spelter—₱ ton.						
Foreign on the spot		25	0	0	25	10 0
" to arrive		25	0	0	—	
Zinc—₱ ton.						
In Sheets		51	10	0	52	0 0
Quicksilver—₱ bottle		19	0	0	—	
Tin—₱ ton.						
English Blocks		101	0	0	111	0 0
Ditto Bars (in bris.)		111	0	0	112	0 0
Ditto Refined		113	0	0	114	0 0
Banca		108	0	0	110	0 0
Straits		105	0	0	107	0 0
* **Tin Plates**—₱ box.						
IC Charcoal	1 qual.	1	17	0	1	19 0
IX "	1 qual.	2	3	0	2	5 0
IC "	2 qual.	1	15	0	1	17 0
IX "	2 qual.	2	1	0	2	3 0
IC Coke		1	9	6	1	11 0
IX "		1	15	6	1	17 0
Canada Plates	₱ ton.	21	0	0	21	10 0
" at works		20	0	0	21	0 0
Iron—₱ ton.						
Bars Welsh, in London		12	0	0	—	
" to arrive		11	10	0	11	15 0
Nail Rods		12	5	0	—	
Nail Rods, Staff'd in L'ndon		12	10	0	—	
Bars		12	10	0	13	0 0
Hoops		14	0	0	15	0 0
Bars at Works		11	10	0	—	
Hoops ditto		13	0	0	14	0 0
Sheets, single, and plates		14	10	0	15	10 0
Pig, No. 1, in Wales		5	0	0	6	10 0
Refined metal ditto		7	0	0	8	0 0
Bars, common ditto		10	15	0	11	0 0
Do, merchant, Tyne or Tees		11	5	0	11	10 0
Ditto, Railway, in Wales		9	15	0	10	11 0
Ditto, Swedish, in London		19	0	0	19	5 0
To arrive		19	0	0	19	5 0
Pig, No. 1, in Clyde		5	0	0	5	5 0
Ditto, f.o.b., Tyne or Tees		4	10	0	5	10 0
Ditto, Nos. 3, 4, f.o.b.					—	
Railway Chairs		5	0	0	5	5 0
" Spikes		12	10	0	14	0 0
Indian Ch'coal Pigs in L'don		10	0	0	12	0 0
Steel—₱ ton.						
Swedish, in kegs (rolled)					—	
Ditto (hammered)		20			21	0 0
Ditto, in faggots		21			—	
English, spring		18			25	
Lead—₱ ton.						
English Pig, common		25			—	
Ditto, LH		23			—	
Ditto, WB		24			—	
Ditto, Sheet		25	0	0	24	0 0
Ditto, Red Lead		25	0	0	—	
Ditto, White		30	0	0	32	0 0
Ditto, Patent		26	10	0	27	0 0
Spanish		21	15	0	22	0 0

* At Liverpool 1s. to 1s. 6d. per ton less. Terne plates 2s. per box below tin plates of similar brand. ‡ Nominal. Add 5s. for each X.

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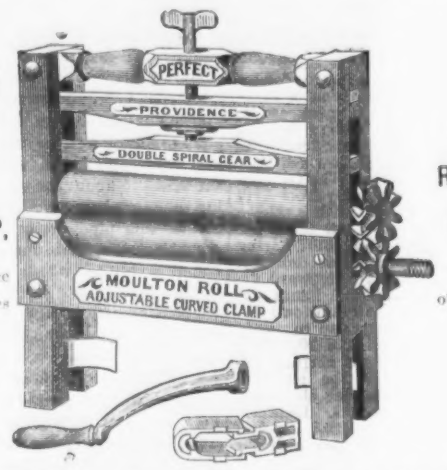
The Providence Wringer.



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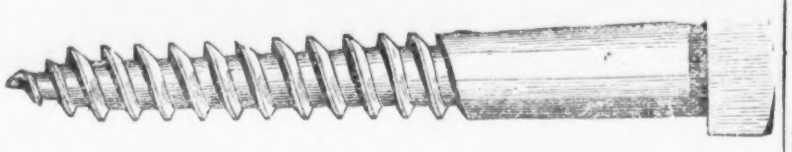

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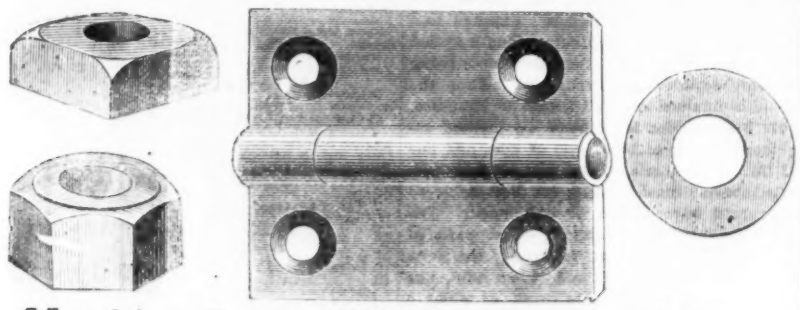

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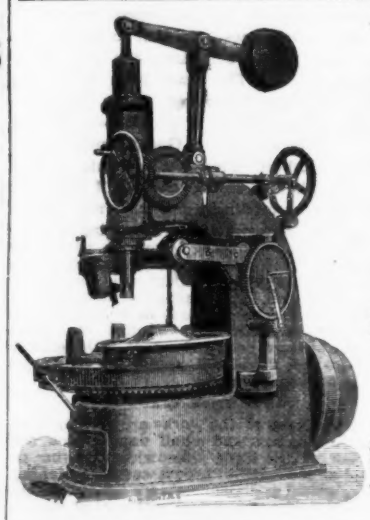

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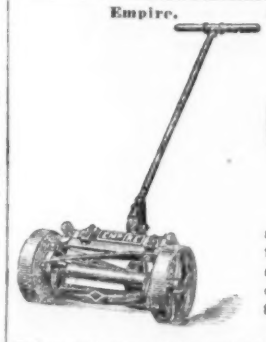
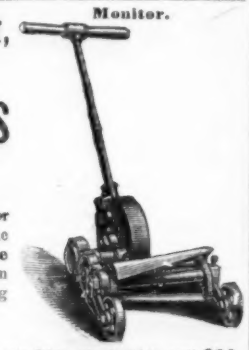


Monitor.



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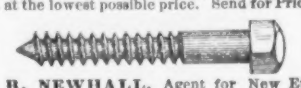

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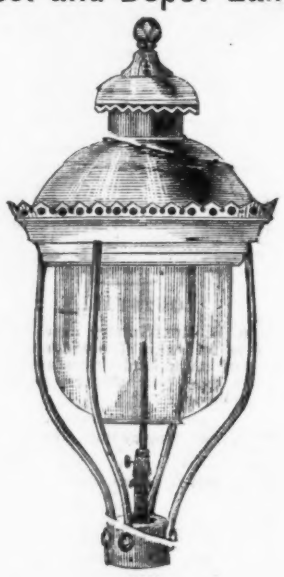

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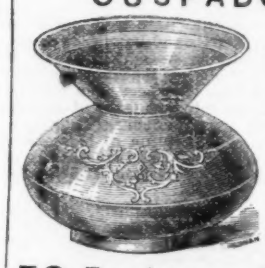

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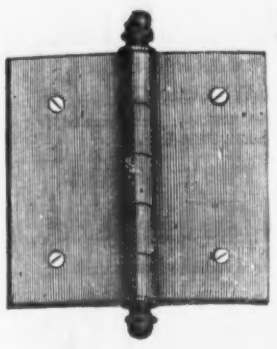

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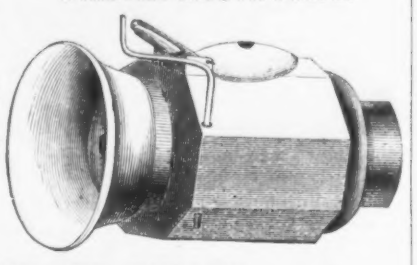

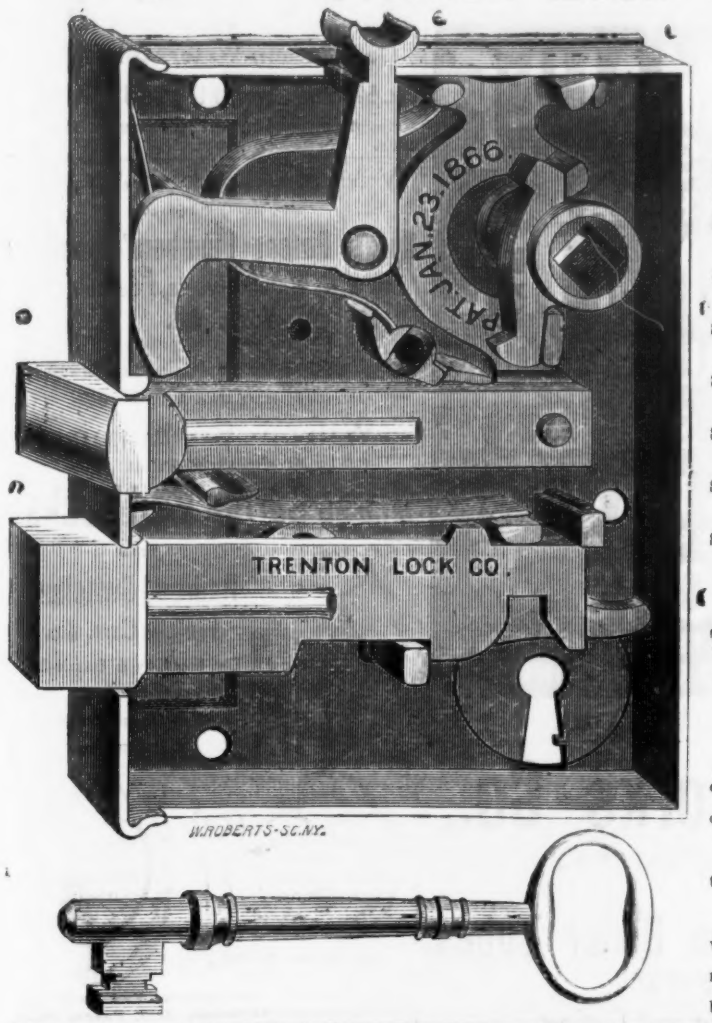

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Square Groove Brass Face and Wheel Pulleys, 2 inch	"	5 00
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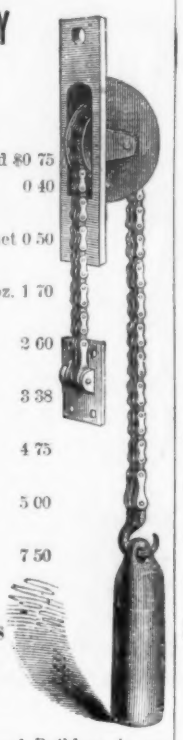

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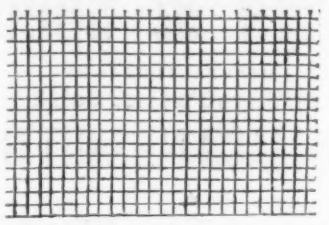

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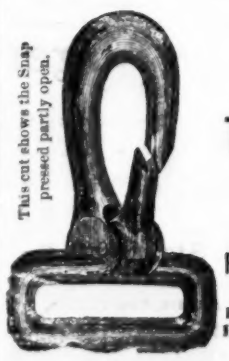

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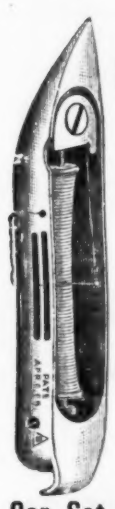

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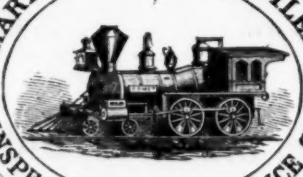

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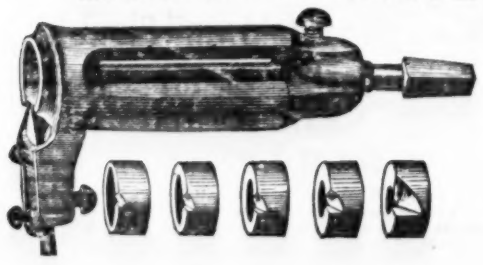
Has for Ten Years been the Favorite of all Practical Wheelwrights.



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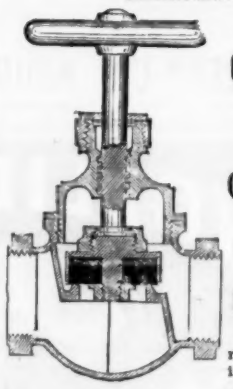

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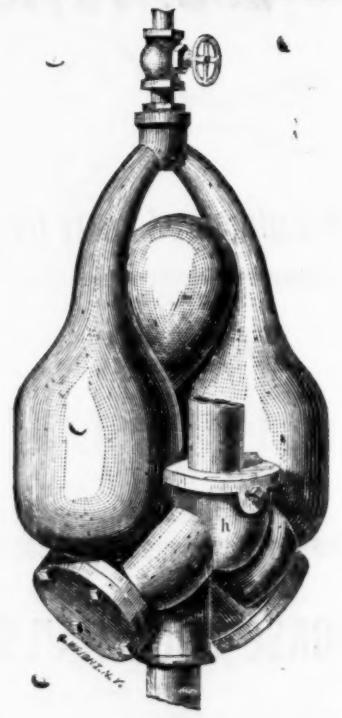

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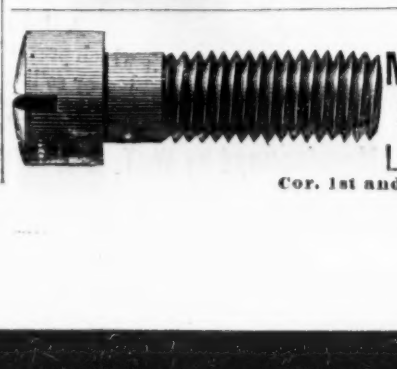

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Coddington T. B. & Co., 25 and 27 Cliff, N. Y. 2
Cort N. L. & Co., 220 & 222 Water, N. Y. 2
Cragin Bros. & Co., 141-5 Lake, Chicago, Ill. 2
Crane U. O., 194 John, N. Y. 4
Gregg H. L. Co., 128 Walnut, Phila. 4
Holmes & Lissberger, 255 & 257 Pearl, N. Y. 2
Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. 2
Quincy J. W., 98 William, N. Y. 2
Thomson & Co., 213 and 215 A. A. Water, N. Y. 2
Van Wart & McCoy, 43 Chambers, N. Y. 2

Metallurgists.
Britton J. Blodgett 839 Walnut, Phila. 28
Drown Thomas M., 1123 Girard, Phila. 28
Maynard & Van Rensselaer, 24 Cliff, N. Y. 28
School of Mines, E. 49th, N. Y. 28

Mitre Boards.
Stevens, G. M., Portland, Me. 13

Molders' Tools.
Carter H. & Sons, 290 Pearl, N. Y. 27

Monuments, *Granite and Bronze.*
National Fine Art Foundry, 218 E. 25th. 6

Mouse Traps, Catchemalive. *Makers of.*
Dietz R. E., 54 and 56 Fulton, N. Y. 36

Nickel Platers.
Smith L. A., 42 Mechanic st., Newark, N. J. 25
New York Nickel Plating Co., 133 West 24th, N. Y. 24

Norway Shapes. *Rollers of.*
Rowland Wm. & Harvey, 948 Beach, Phila. 36

Nute Broker.
Gallaudet F. W., 3 and 5 Wall, N. Y. 4

Nuts, Bolts, etc., *Makers of.*
Ætna Nut Co., Southington, Conn. 20
American Bolt Co., 210 Lawrence, Lowell, Mass. 12
Arms, Bell & Co., Youngstown, O. 12
Carpenter David, 402 Water, N. Y. 4
Clark Bros. & Co., Millsdale, Conn. 12
Fuller, Lord & Co., Boonton, N. J. 4
Haskell W. H. & Co., Pawtucket, R. I. 20
Lewis, Oliver & Phillips, Pittsburgh and N. Y. 20
Plumb, Burdict & Barnard, Buffalo, N. Y. 33
Sternbergh J. H., Reading, Pa. 20
Union Nut Co., 78 Beekman, N. Y. 21

Oilers. *Makers of.*
White J. H., Newark, N. J. 12

Paints and Oils, *Dealers in.*
Devoe F. W. & Co., 117 Fulton, N. Y. ....

Patent Solicitors.
Howson & Son, Phila. and Washington, D. C. 12
Leggett & Leggett, Washington, D. C. 6
Whitney J. A., 128 Broadway, N. Y. 12

Picture Nails, etc., *Manufacturers of.*
Richards T. C. & Co., 47 Murray, N. Y. 24

Pipes, Fittings, etc., *Makers of.*
Eaton & Cole, 58 John, N. Y. 22
McNab & Harlin Mfg. Co., 56 John, N. Y. 22
Nelson, Finkel & Co., 439 E. 10th st., N. Y. 22
Pancoast & Maule, 227 Pear, Phila. 22
Chas. Gregg Mfg. Co., 62 and 64 Gold, N. Y. 22

Pipe, Water and Gas, *Makers of.*
Brick R. A. & Co., 112 Leonard, N. Y. 6
Graff William & Co., Pittsburgh, Pa. 22
Morris, Tasker & Co., 15 Gold, N. Y. 22
National Tube Works Co., 78 William, N. Y. 22
Starr Jesse W. & Sons, Camden, N. J. 6
Warren Foundry & Mach. Co., Phillipsburg, N. J. 22
Wood R. D. & Co., 173 Broadway, N. Y. 7

Piston Packing.
Canfield John & Co., 131 Fairmount Ave., Phila. 30
James Glanding, 115 Queen, Philadelphia. 24

Plate Irons. *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Conn. 7
Middletown Tool Co., Middletown, Conn. 21
Sandusky Tool Co., Sandusky, O. 30

Planes, *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Conn. 7
Greenfield Tool Co., Greenfield, Mass. 7
Ohio Tool Co., Columbus, O. 23
Stanley Rule & Level Co., 35 Chambers, N. Y. 24

Plumbago Lubricator.
N. Y. Black Lead Works, 172 Forsyth, N. Y. 36

Plumbers' Materials, *Manufacturers of.*
Carr Wm. S. & Co., 106 Centre, N. Y. 22

Presses, Power. *Makers of.*
Am. Saw Co., 1 Ferry, N. Y. 20
Peck Milo & Co., New Haven, Ct. 31
The Stiles & Parker Press Co., Middletown, Ct. 35

Pressure Blowers. *Makers of.*
Sturtevant B. F., 72 Sudbury, Boston. 35

Pumps, *Makers of.*
Douglas W. & B., Middletown, Conn. 7
Rumsey & Co., Seneca Falls, N. Y. 7
Union Mfg. Co., 99 Chambers, N. Y. 7
Valley Mch. Co., Easthampton, Mass. 7

Pyrometers.
Brown Edward, 311 Walnut, Phila. 13

Railroad and Miners' Tools.
Hogan, Clark & Sleeper, Boston. 9

Rails, *Importers of.*
Congreve Chas. & Son, 104 and 106 John, N. Y. 32
Smith Gilead A. & Co., 62 Broadway, N. Y. 4

Rails, Iron or Steel, *Makers of.*
Atkins Bros., Pottsville, Pa. 6
Cambria Iron Co., Johnstown, Pa. 5
Cleveland Rolling Mill Co., Cleveland, O. 6
Griswold John A. & Co., Troy, N. Y. 32
Milwaukee Iron Co., Milwaukee, Wis. 6
Springfield Iron Co., Springfield, Ills. 4

Razor Straps, *Makers of.*
B. F. Badger, Charlestown, Mass. 3

Refrigerators.
Jewett John C. & Sons, Buffalo, N. Y. 8

Rolling Mill Machinery, etc., *Manufacturers of.*
Moore James, Cor. 16th and Buttonwood, Phila. 35

Rolls, Chilled and Sand, *Makers of.*
Garrison A. & Co., Pittsburgh, Pa. 4

Rules, *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Ct. 7
Stanley Rule and Level Co., 35 Chambers St— 24

Sash Chain.
Thomas Morton, 15 Murray, N. Y. 13

Saws, *Makers of.*
Atkins E. C. & Co., Indianapolis, Ind. 10
American Saw Co., 1 Ferry, N. Y. 10
Boynton E. M., 80 Beekman, N. Y. 10
Flint J., Rochester, N. Y. 10
Disston Henry & Sons, Phila. 25
Hoe R. & Co., 31 Gold, N. Y. 10
McNeice Wm., 515 Cherry, Phila. 10
James Ohlen, Columbus, O. 10
Peace Harvey W., Williamsburg, N. Y. 10
Spear & Jackson, 116 Duane, N. Y. 29
Wheeler, Madden & Clemson, Middletown, N. Y. 10

Saw Frames, Wood, *Makers of.*
Boynton E. M., 80 Beekman, N. Y. 10
Peace Harvey W., Williamsburg, N. Y. 10

Scales, *Manufacturers of.*
Knowles J. A., Jr., Lowell, Mass. 10
Riehle Bros., 9th near Coates, Phila. 20
Shattuck W. F. & Co., 113 Chambers, N. Y. 7

Scissors, *Manufacturers of.*
Rowe & Post, 120 Chambers, N. Y. 11

Screws, *Makers of.*
American Screw Co., Providence, R. I. 13
Miles F. S., 205 Quarry, Phila. 20

Screws, *Importers of.*
Bruce Geo. W., 1 Platt, N. Y. 6
Field Alfred & Co., 47 John, N. Y. 12
Gueutal George, 39 W. 4th, N. Y. 10

Shovels, &c.
Clement & Hawkes Mfg. Co., Northampton, Mass. 28

Skates.
Grahain & Haines, 88 Chambers, N. Y. 30

Smelting Works.
Reeves Paul S., 760 South Broad St., Phila. 36
Du Plaine & Co., 1330 Callowhill, Phila. 5

Stamped and Japanned Tin Ware.
Jewett John C. & Sons, Buffalo, N. Y. 21
Scheider Jos. & Co., 58 Beekman, N. Y. 20
Shepard Sidney & Co., Buffalo, N. Y. 27

Steam Hammers, etc., *Makers of.*
Dudgeon Richard, 24 Columbia, N. Y. 35

Snaps, Harness. *Makers of.*
Middletown Tool Co., Middletown, Conn. 12

Speed Indicators, *Makers of.*
Connecticut Cutlery Co., Naugatuck, Conn. 21

Squares, Steel and Iron, *Makers of.*
Hart, Bliven & Mead Mfg. Co., 243 Pearl, N. Y. 9

Steam Pumps, etc., *Manufacturers of.*
Carr A. 43 Cortlandt, N. Y. 24
Guild & Garrison, Williamsburgh, N. Y. 2
Hall C. Henry & Co., 20 Cortlandt, N. Y. 22
Philadelphia Hydraulic Works, Evelina street, east of Third street, Phila. 25

Steam Traps.
Alonzo L. Jones, 130 S. 4th, Phila. 10

Steel Importers.
Carr J. & Riley, 82 John, N. Y. 32
Cocker Bros., Sheffield, England. 32
Congreve Chas. & Son, 104 and 106 John, N. Y. 32
Hobson Francis & Son, 97 John, N. Y. 32
Jessop Wm. & Sons, 91 and 93 John, N. Y. 32
Moss F. W., 80 John, N. Y. 32
Piersons & Co., 24 Broadway, N. Y. 4
Sanderson Bros. & Co., 16 Cliff, N. Y. 32
Sanderson Geo. & Co., 57 John, N. Y. 32
Van Wart & McCoy, 43 Chambers, N. Y. 32
Wardlow S. & C., 13 Gold, N. Y. 32
W. Hawksworth, Ellison & Co., 73 John, N. Y. 32

Steel Manufacturers.
Anderson & Woods, Pittsburgh. 33
Chrome Steel Co., Brooklyn, E. D. 38
Cleveland Rolling Mill Co., Cleveland, O. 6
Gautier D. G. & Co., Jersey City, N. J. 32
Griswold John A. & Co., Troy, N. Y. 32
Hussey, Wells & Co., Pittsburgh. 33
Miller, Barr & Parkin, Pittsburgh. 32
Reese, Graff & Woods, Pittsburgh. 33
Reiter, Lavelly & Co., Pittsburgh. 34
Rowland Wm. & Harvey, Frankford Phila. 36
Singer, Nimick & Co., Pittsburgh. 32

Stone Crushing Machines.
Blake Crusher Co., New Haven, Ct. 9

Stove Boards, *Manufacturers of.*
Shepard Sidney & Co., Buffalo, N. Y. 27

Stove Polish, *Makers of.*
"Gem" Stove Polish, 172 Forsyth, N. Y. 36

Twist Drills, *Makers of.*
Morse Twist Drill & Mach. Co., N. Bedford Mass. 31

Tackle Blocks, *Makers of.*
Burr & Co., 31 Peck Slip N. Y. 10

Tacks.
American Tack Co., 117 Chambers, N. Y. 30
Field A. & Sons, Taunton, Mass. 9
Grundy & Kenworthy, 165 Greenwich, N. Y. 30
Dunbar, Hobart & Whidden, S. Abington, Mass. 30
Loring Samuel, Plymouth, Mass. 30

Tea Trays, *Importers of.*
Dickinson Henry, 66 and 68 Reade, N. Y. 11

Trowels, etc., *Makers of.*
Rose Wm. & Bros., 36th and Filbert, W. Phila. 10

Turbine Water Wheels. *Manufacturers of.*
Stout, Mills & Temple Dayton, O. 24
Whitehill, Smith & Co., Newburgh, N. Y. 34

Tube Expanders.
Dudgeon Richard, 24 Columbia, N. Y. 28

Valves, Gas, Water and Steam.
Ludlow Valve Mfg. Co., N. Y. 35

Vises.
Backus Vise Co., 78 Beekman, N. Y. 29
Fisher & Norris, Trenton, N. J. 29
Hollidge E. C., Minneapolis, Minn. 21
Howard Iron Works, Buffalo, N. Y. 23
Trenton Vise & Tool Works, 101 & 103 Duane, N. Y. 3
Wilson Mfg. Co., 37 Chambers N. Y. 12

Water Filters.
Jewett John C. & Sons, Buffalo, N. Y. 14

White Lead, *Manufacturers of*
Brooklyn White Lead Co., 89 Maiden Lane, N. Y. 28
Colgate Robert & Co., 287 Pearl, N. Y. 28
Cornell Lead Co., Buffalo, N. Y. 28
Jewett John & Sons, 182 Front, N. Y. 28
Lewis John T. & Bros., 231 S. Front, Phila., Pa. 28
Union White Lead Co., 26 Burling Slip, N. Y. 28
Wetherell & Bro. 41 N. Front, Phila. 28

Wire, *Manufacturers of.*
Gilbert, Bennett & Co., 223 Pearl, N. Y. 2
Prentiss Geo. W. & Co., Holyoke, Mass. 2
Townsend W. P. & Co., Pittsburgh, Pa. 2
Washburn & Moen Mfg. Co., Worcester, Mass. 2

Wire Goods, *Manufacturers of.*
Chicago Wire Cloth Mill, Chicago, Ill. 2
Gilbert, Bennett & Co., 223 Pearl, N. Y. 2
Howard & Morse, 45 Fulton, N. Y. 2
Hopkins A. W., West Broadway, N. Y. 2
Howe, Bigelow & Co., Worcester, Mass. 2
Parker Sam'l & Co., Wethersfield, Ct. 2

**Wire Rope, Iron and

PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, March 2, 1874.

While the American people are more given to boasting of the superiority of their country, its greatness, its vast resources and wonderful progress, than any other nation of the globe, they exhibit, when the real necessity arises for its display, less real patriotism and national pride than any people of equally advanced civilization. For the half century succeeding American Independence we never tired of reiterating the benefits derived from having "thrown off the yoke," &c. Our school boys were taught to revere the men of revolutionary days, and we never halted in what the English term "bounce" as to the greatness of our rivers, mountains, lakes and mines, including our own personal energy. But behold the change. The century has not expired before all this is forgotten. The efforts to properly celebrate before the world the hundredth anniversary of our independence, and to invite the world to join us in the ceremony, is dwarfed and narrowed into a local exhibition by one party; sneered at as emanating from a single class only by another, scorned as anti-republican by a third, and condemned as unnecessary extravagance by those whose hands are yet soiled with the spoils of misconducted official duty. To admit that the people of the United States can afford to allow their Centennial Anniversary to pass without marking it as a national epoch in their history, is to admit the death of all national pride and self respect. No more possibly fitting method of celebrating such an event can be devised than in an exposition of the industrial progress of the country. Civilization, and what we call progress, has outlived the barbaric displays of the trophies of war: conquered nations, enslaved peoples, the triumphs of the sword, with which the nations of the old world celebrated their advancement. We point to material progress, to the telegraph, the locomotive, the machine shop, the developed mine, the cultivated prairies, the country school house and the book and newspaper press of our times as our trophies. Very naturally the spot where the first decisive act of independence which created the republic was performed is selected as the most fitting locality for the celebration of the one hundredth anniversary thereof, and very unnaturally there is immediately developed a spirit of local jealously which is as contemptible as unworthy the American people. The expenditure necessary for a celebration at all proportionate to the importance of the occasion requires an appropriation from the national treasury, and immediately a Congress, not yet cleansed from the taint of Credit Mobilier stock jobbing, opposes any outlay on the score of economy. The greatest statesman of the country leads the opposition in a puerile argument against monarchies to celebrate the success of the only successful great republic.

Pity for our people when our leading Senator is only great in the cause of enfranchising one race, and little in everything else! Could we turn back to the Senate of 1840, and call the Centennial Appropriation bill before the men there then assembled, can there be a doubt what would be the responses of Clay, or Webster, or Calhoun, State sovereignist as the latter was? The duty of the press of the country was clear and unmistakable in the matter, and thirty years ago the country would have rung with enthusiasm in answer to the appeals of Horace Greeley, James Watson Webb, or Hudson, in New York, Joseph R. Chandler in Philadelphia, Prentice in Louisville, and Chandler in New Orleans. Now, the *Tribune*, in its altered estate, feebly suggests the doubtful propriety of the attempt at a Centennial; the *World* openly opposes the Exposition, and the papers of other sections do not see the advantage to be gained. It matters not whether the best men attainable for the management of the Centennial have been secured or not—the subject at issue is a national one, and affects not only the self-respect, but the standing, of the American people before the world, and to allow this effort at a fitting celebration to fail, is to stultify that people for all time. The people which ceases to prize itself and its institutions, takes the first step toward their dissolution. The hostile action in Congress during the past week has stirred the feelings of the people of Philadelphia and Pennsylvania, as they have not been since the outbreak of the war. Had Boston or New York been the scene of the Declaration of American Independence, Philadelphia would have joined as heartily in the celebration as she did during the war in the contributions to the sanitary fair for the benefit of Massachusetts and New York soldiers, in common with those of other States. If it be a question of dollars and cents, the States exhibiting will receive equal pecuniary benefit from their products exhibited, with the locality of the exhibition. If Massachusetts exhibits cotton goods and shoes to the world, of better quality than any other State or foreign country, she will attract the customer as surely as the South can with cotton, or Michigan with specular ore, or Pennsylvania with locomotives, machinery or iron. The spirit of opposition to the Centennial is a spirit of mean jealousy, a spirit devoid of patriotism, and the spirit which will ultimately destroy the American federation. Headed by John Quincy Adams, of Boston, who has nothing in common with his associates save his name, aided by Bigelow, who sees nothing possible of good in the country outside of Boston, supported by the New York *World*, which opposes the Exposition because likely to strengthen the Union and soften the reminiscences of the war, feebly echoed by the *Tribune*, which remains a memento of its great founder and editor only in its title, all else being lost, this spirit of opposition threatens to damage the American people at home, abroad, in their own self-respect, in the respect of other nations, pecuniarily and materially, to a very sensible degree.

No class of our people would be more directly benefited, in a pecuniary point of view, by the Centennial Exposition than that represented by *The Iron Age*, and the editorial columns of this paper have shown no uncertain spirit in boldly and persistently urging it. Already we are feeling the decided necessity of an export market for many kinds of manufactures here represented. That market would follow immediately on the exposition of these articles to the representatives of foreign nations attracted to our shores by the Centennial. Let us have a fitting exhibition of our progress in the century, or cease to nauseate the world with our boastings. The people of Pennsylvania have sustained the effort so far, and if need be, the same people will carry out the original plan at their own entire expense, and gladly invite the other States to share the benefits derived; but for the honor of the United States and for the sake of all mankind, looking to us as the exemplars in the problem of self-government, let us show what a hundred year old republic is. I have exhausted my space on this subject, but know of nothing which more closely concerns your readers at this moment, or more thoroughly exercises the people of the city I write from just now.

The Economizing of Fuel in the Smelting of Iron.

The best means that can be adopted for the purpose of effecting a saving in the present large expenditure of fuel in the smelting of ores, is undoubtedly one of the most important questions that can be touched upon in connection with the future of our coal and iron trades. To hold even our present position in the various markets of the world that we have long looked upon as nearly our own, especially as regards our iron and steel manufactures, is almost more than we can do under the most favorable circumstances. But we shall be much less able to do so now that the minerals, not only on the Continent, but in the most distant parts of the globe, are being developed, unless we can produce our most important staples, such as coal and iron, much cheaper than at present. One means of effecting that object has long been considered by our leading ironmasters, and to some extent acted upon. It is to see that none of our valuable products are wasted. At the present time no less than 40,000,000 tons of coal, being one-third of all that is annually raised, are consumed in connection with the various branches of the iron trade, and it is admitted that a very large proportion of that immense quantity of fuel is absolutely thrown away, to the injury not only to health, but also to vegetation as well. If we take the annual make of coke in the county of Durham for iron making purposes at 3,500,000 tons, there is, according to the testimony of one of our best authorities, Mr. Bell, a loss of no less than 2,500,000 tons of fuel, which is thrown off and burnt in the air. How that great loss can be utilized is the very interesting problem that it is desirable to see fully solved. The waste heat of coke ovens in some instances is partially used for driving machinery and other purposes, but that really represents an infinitesimal quantity as compared with the total loss. Much, we believe, has been done by the ironmasters of Durham in effecting a saving in fuel in smelting even the ores of Cleveland, by no means particularly rich in iron, for whilst some ten years ago the quantity of coal required in that county to produce a ton of pig iron was 70 cwts., now the same can be done with from 41 cwts. to 48 cwts. If such a material saving can be accomplished in a district where coal is abundant, surely it would be to still greater advantage in localities far distant from any coal field, and to which the carriage rate for fuel is nearly equal to its cost at the pit mouth. Such must really have been the case a couple of years ago at more than one place, and the great wonder is that the pattern set by the ironmasters of Durham has not been followed by those in other districts, for by so doing they would have reaped a very great benefit, and have put themselves in a much better position for competing with those whose works were more favorably situated for supplies of smelting requirements. Having the returns before us of the iron made in 1872, recently published, and supplemented with the quantity of fuel used in its production in each county, we are enabled to trace the amount of coal used in the making of a ton of pig in every iron district in the kingdom. As this, we believe, has not yet been given, we cannot but hope that the very suggestive matter thus furnished will be the means of more attention being paid to a matter of such vital importance to the interest of our ironmasters as well as all those in any way interested in the production of pig and manufactured iron. The following figures show the total of pig made, and the coal consumed in its manufacture. The consumption of fuel is given, omitting the fractional parts of the cwt.:

	Pig. Tons.	Coal. Tons.	Coal per ton of iron made. Tons.	cwts.
Northumberland	38,766	108,234	2	16
Durham	760,172	1,782,532	2	7
North Yorkshire	1,122,114	2,533,781	2	5
West Yorkshire	148,636	443,654	3	0
Derbyshire	283,375	821,833	2	18
Lancashire	524,041	911,869	1	15
Cumberland	440,575	1,077,783	2	9
Shropshire	133,046	398,197	3	0
Stafford, North	275,925	817,753	2	19
Stafford, South	673,470	1,932,509	2	16
Northampton	59,424	183,523	3	2
Lincolnshire	36,989	105,678	2	18
Gloucester	46,226	125,461	2	17
Somerset	7,600	18,300	2	8
North Wales, Denbigh	41,464	111,296	2	14
N'th Wales, Flintshire	13,228	45,601	3	9
South Wales—Glamorganshire: Anthracite	25,678	72,372	2	16
South Wales—Glamorganshire: Bituminous	462,041	1,172,453	2	11
Brecknock	28,504	88,519	3	2
Scotland	1,000,000	3,215,500	2	19

From the above figures it will be seen that the rich red hematites of Lancashire, as might be expected, do not require so much fuel per ton in smelting as the others, and take the first place; the same description of ore worked in Cumberland also stands favorably, as do the hematites and other ores found in Somersetshire. Still the working of the ordinary argillaceous ores of Durham and Cleveland show to the most advantage as compared with the same description of ironstone found in other parts of the country. It is, therefore, evident that in many districts the fuel used has not been of the best description, and that no attempt has been made to minimise the consumption, as has been the case in the North of England. In Northamptonshire, where some of the hydrated oxide contains as much as 40 per cent. of iron, there does not appear to be any sufficient reason why it should take nearly 3 tons of coal to make 1 ton of pig, more especially as the fuel has to come a distance of nearly 80 miles. An analysis of the figures will show that in six districts, taken together, the average quantity of coal required for making a ton of pig iron is rather less than 46 cwts., while with regard to the others it ranges from 54 to 62 cwts. It is, therefore, evident that were the various ores smelted in all the districts as they are in North Yorkshire, instead of the coal used in our blast furnaces being 17,200,000 annually, it would be some million tons less—a source of profit to iron masters, and would materially benefit the country generally.—*London Mining Journal.*

Steam-Heating
FURNACE.

We have acquired the exclusive right in a large territory, to manufacture and put in practice a Superheated Steam Furnace, without pressure, for the warming of buildings, as secured by Letters Patent to Mr. H. G. Bulkley, a well known inventor, who has done much by his genius for the progress of the useful arts.

We are prepared to supply the trade upon our usual liberal terms, and also to contract for the warming of buildings of every description.

The pungent articles which have lately appeared in the New York *Times*, and other leading papers, showing the injurious and fatal effects of breathing dry furnace air, which is always more or less contaminated with coal gas and motes of vegetable and animal matter, scorched by contact with the red hot plates, producing what is called "burnt air," have awakened serious attention to this subject, and have created a demand for some improved construction in warming our buildings, combining cheapness in cost and for repairs, safety, comfort, and economy in fuel.

We believe that every requisite the public can desire is found in our improved Steam Heater.

It has been tested by some of the best and most practical men in this country, to whom reference is made, and we guarantee its satisfactory operation, when put up and used according to our directions.

Among its many advantages over the old style of Hot Air Furnaces we will mention:

1. The air for warming the building is not brought into contact with any portion of the furnace, or with any highly heated metal, and, therefore, no coal gas, nor smoke, nor unpleasant odors can by any possibility be conducted into the rooms above.

2 The air is conducted through wrought iron pipes, placed within the furnace chamber and surrounded by an atmosphere of superheated steam. None of its natural moisture is removed, and therefore no artificial moisture is required.

White walls and ceilings and delicately tinted paper are not discolored, as in the use of ordinary Hot Air Furnaces, nor are paintings injured. The growth of plants and flowers is not retarded, nor their life destroyed.

The wood work of the house and the furniture are not warped nor displaced.

There is no decomposition of vegetable or animal matter, filling the house with sickening and disgusting odors.

There are no headaches, dizziness, and coldness of the extremities from dry, fiery, irritating heat, which undermines the nervous organization and produces premature decay.

On the contrary, we secure an atmosphere as healthful and delightful as that warmed by the sun, robbing winter, in our houses at least, of all its terrors.

3 The water for this heater is supplied automatically to an open boiler, constructed as a part of the furnace, the steam generating from the same being superheated by contact with the plates of the furnace, and used as a medium for conveying heat to the pure air passing through the pipes.

Superheated steam conveys heat with the speed of electricity, or about 476 times as rapidly as air, the latter being a slow conductor, and therefore vastly inferior as a medium of communication.

The only outlet for the steam is through two half-inch holes into the ash pit, whence it passes through the burning fuel, aiding the combustion of the gases, and thus economizing fuel.

Whatever may be the amount of water thus evaporated, not a drop of it can be found after it enters the steam chamber.

4. In the use of this heater the danger from fire is entirely removed. Insurance companies could well afford to reduce their rates upon buildings warmed in this manner.

5. The cost of all the steam and hot water furnaces heretofore made has been so great that their use has been restricted. We have prepared seven sizes of this improved heater, which we can sell, complete and ready for the pipes and registers, from $100 to $600 each, and we guarantee them to produce better results than any of those costing from six to ten times as much.

They are adapted to the smallest cottage or the largest building, and are set as ordinary portable furnaces, or in brick chambers, as may be preferred.

The annual costs for repairs on these heaters will be less than in ordinary furnaces, for the reason that the steam atmosphere protects the castings.

The skill and attention required in their management is also less, for the reason that they are provided with the "Argand or Clinkerless Grate," from which the clinkers and other refuse can be daily removed without disturbing the fire, thus making it perpetual for the season.

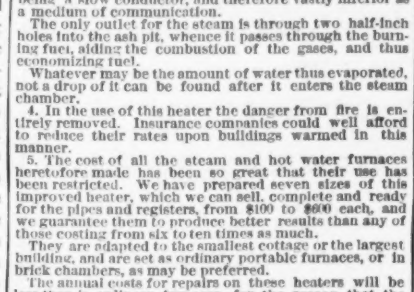
For schools and all rooms in which numbers are congregated, absolute pure air is indispensable to comfort and health. When the merits of this Steam Heater become known, and the low price at which it can be obtained fully understood, School Commissioners will hesitate about continuing their present system of heating.

The public have called loudly for just this thing, which we now offer at prices within the reach of all. It remains to be seen whether our efforts to respond to this call will be seconded.

PERRY & CO., Albany, New York.
St. George Building.
86 Beekman St., New York.
See illustration in next week's issue of *The Iron Age*.

ALTHOUSE & UMBERGER,
Commission Merchants
For the exclusive sale of
PIG IRON,
341 Walnut St., Phila.

TUCKER'S
Alarm Tills.



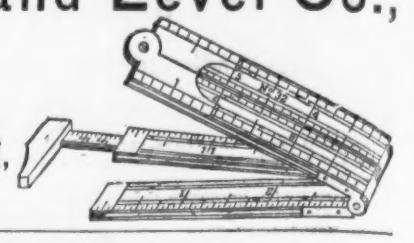
Will furnish with first Order above case, gratis, for Sample Room. Send for price list to the Trade.
TUCKER & DORSEY, Manufacturers
Indianapolis, Ind.

Patented Steam and Hydraulic. April 1, 1868

EAGLE PACKING,

Of various sizes for ENGINES and PUMPS, manufactured by JAMES GLANDING & CO., No. 115 Queen St., Philadelphia. What the proprietors claim for the Eagle Packing: 1. Its general adaptation to all purposes for which packing is used. 2. Its durability. It will outlast any other article in use. 3. Its cheapness. It can be furnished to the consumer at a lower rate than any other packing.

Stanley Rule and Level Co.,
WAREROOMS,
REMOVED TO
No. 35 Chambers Street,
NEW YORK.



BUCK BROTHERS,
MILLBURY, MASS.
The most complete assortment in the U. S. of Shank, Socket Firmer, and Socket Framing
CHISELS.
Gauges of all lengths, and circles beveled inside or outside. Nail Sets, Scratch and Belt Awls, Chisel Handles of all kinds. Orders filled promptly, generally same day as received.

ROEBLING'S
WIRE ROPE
For Best
IRON or STEEL WIRE HOISTING, RUNNING or STANDING ROPES, or BEST GALVANIZED CHARCOAL WIRE ROPES FOR SHIP'S RIGGING,
Address, JNO. A. ROEBLING'S SONS, Manufacturers,
Trenton, N. J. or 117 Liberty St., N. Y.
Wheels and Rope for transmitting power long distances. Send for Circular and Pamphlet.

Licensed by United Nickel Company.
NEW YORK
Nickel Plating Co.
Works, 133 & 135 W. 25th Street,
Office, No. 18 Park Place,
ISAAC ADAMS, Jr., Prest. NEW YORK.

FLUOR SPAR
As a flux for foundrymen and iron and steel works. Fine ground and No. 1 lump in barrels, or in bulk, as mined. PORTER & STENTON,
Sole Agents Mineral City Mining and Smelting Co.,
7 Public Landing, Cincinnati, O.
Send for a circular.

Alexander Brothers,
Manufacturers of OAK TANNED
LeatherBelting
410 & 412 North 3d, Philadelphia, Pa.

BRADFORD & SHARP,
Manufacturers of
LeatherBelting
OAK TANNED,
57 Walnut Street, Cincinnati, O.
We furnish many of the largest Iron Mills in the West, and guarantee quality of all goods sold.
Send for prices

PAGE BELTING COMPANY.
Sole Manufacturers of
TRADE MARK.
Page's PAGE'S PATENT TANNED Leather manf'd under Pat. MAY 8—1866. PAT. SEPT. 12, 1871. Patent
Tanned Belting.
GENERAL MILL SUPPLIES.
No. 24 Exchange Street, Boston.

PATENT FLOOR & DOOR CLAMP.
Patent Hose Shield,

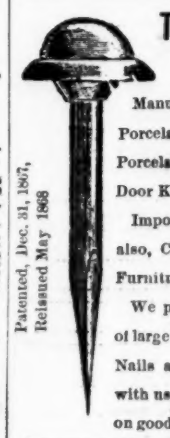
and 8 Sizes Rates.
J. A. HAASE, rear 116 Vinborn St.
(East of 1073 Germantown Ave.) Philadelphia, Pa
Send for Circular.
HAASE'S Patents.

CRINDSTONES
2000 TONS ON HAND. FOUNDED 1810.
J.E.MITCHELL.PHILA.

Schweitzer Mfg. Co.,
57 Reade Street, New York.

CONTINENTAL LOCKS,
Made of Wrought Iron or Brass, very superior in quality, and only an auger used in mortising.
SCHWEITZER PAD LOCKS,
EXCELSIOR COMPASSES.
EXCELSIOR DIVIDERS,
WITH
STUBS' STEEL POINTS,
Best and Cheapest Goods in the market. Sole Agents for the United States for
NEWBOULD'S FILES AND TOOLS
French Coffee Mills.
NOBLE MFG. CO., Tools, Ship Augers, &c.
Emery, Waterhouse & Co., Shovels & Spades
We also make a superior
AXE. { "Queen of the Forest," "Wood Chopper's Pride," &c.
Disston's Saws. (Largest Stock in the City).
General dealers in
FOREIGN & DOMESTIC HARDWARE.

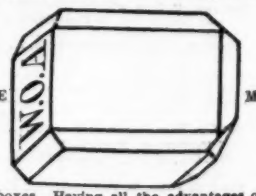
A. PARDEE, Hazelton, Pa. J. G. FELL, Phila.
A. PARDEE & CO.,
303 Walnut St.,
PHILADELPHIA
MINERS AND SHIPPERS OF
Lehigh Coals.
The following superior and well-known Lehigh Coals are mined by ourselves, and firms connected with us, viz.
A. Pardee & Co. { HAZLETON. CRANBERRY. SUGAR LOAF
G. B. Markle & Co. { JEDDO. HIGHLAND.
Pardee, Bro. & Co. LATTIMER.
OFFICES:
WM. LILLY Mauch Chunk, Pa.
WM. MERSHON, Agent, 111 Broadway N.Y
WM. H. DAVIS, Agent, Easton Pa.



Patented, Dec. 31, 1867, Released May 1868

T. C. RICHARDS & CO.,
47 Murray Street, N. Y.,
Manufacturers of Richards' Patent Porcelain-head Picture Nails; also, Porcelain Picture, Drawer, Shutter, and Door Knobs, etc., etc.
Importers of German Brass Goods, also, China, Gilt, Steel, and Silvere Furniture Nails Wire Nails etc., etc.
We particularly invite the attention of large buyers to our Patent Picture Nails and Knobs being a specialty with us, we offer satisfactory discounts on good orders.

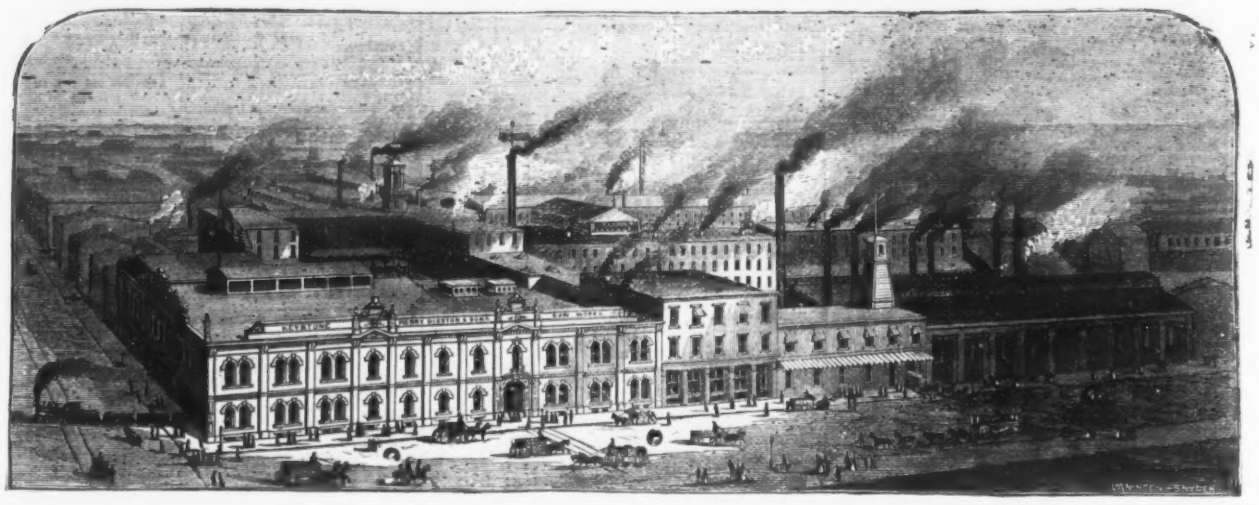
THE PREMIUM REFINED BORAX
Formerly known as the J. T. & Co. brand, and the only true California Borax now made, will hereafter bear this



upon the boxes. Having all the advantages of dryness claimed for any other product from the Pacific coast, the form of the crystals, denoting purity, is the same as the best English.
It received the first premium from the American Institute, 1872. Consumers can rely upon the strength and purity of this brand.
Delivered in New York, Boston or Hartford.
BEACH & CO.,
Hartford, Conn., Agents.

Keystone Saw, Tool, Steel and File Works,

PHILADELPHIA.



HENRY DISSTON & SONS,

MANUFACTURERS OF

Warranted Cast Steel Patent Ground & Tempered Hand, Panel & Rip Saws,

Disston & Sons' Patent Improved Combination Hand Saws,
"Mechanics' Own" Hand and Back Saws, to run without Set,
Gent's Half Back Bench Saws,
Cast Steel Compass Saws,
Cast Steel Table and Pruning Saws,
Improved Quality Cast Steel Back Saws, with Steel Backs,
Butchers' Bow Back Saws,
Turning or Chair Webs,
Felloe Webs,
Butchers' Saw Blades,
Improved Reversible Hack Saws,
Hack Saw Blades,
Patent Ground and Tempered Cast Steel Wood Saws,
Wood Saw Frames,

Saw Handles, all kinds,

Patent Ground and Tempered Circular Saws, Circular Top Saws for Double Mills,

Warranted Extra Cast Steel Shingle Saws, Concave Saws, Circular Saw Mandrels of the latest and most approved styles

Warranted Extra Cast Steel Patent Ground and Tempered Mill, Mulay, Gang and Drag Saws.

Disston's "Great American" Cross Cut Saw.
" "Lumberman" " "
" "Climax" " "
" "Nonpareil" " "

Extra Spring Steel Plain Tooth Cross Cuts, Set and Sharpened.
Hook Tooth Cross Cut Saws No. 2, Set and Sharpened.
Hook Tooth Cross Cut Saws No. 3, Set and Sharpened.
Cast Steel Plain Tooth Cross Cuts Nos. 2 & 3, Set and Sharpened.

HENRY DISSTON & SONS' WARRANTED SAW FILES.

We manufacture Files specially adapted for keeping in order the Teeth of our Improved Cross Cut Saws, "The Great American," "The Lumberman," "The Climax," "The Nonpareil."

NOTICE.

Our No. 7 Hand Saws have attained a National reputation for uniform excellence of manufacture, of which we are justly proud, and we take this method of assuring the trade that these Saws for 1874, will exceed in point of finish all previous efforts to meet the wishes of our friends.

New York Wholesale Prices, March 4, 1874.

HARDWARE.

Anvils.
Solid Cast Steel.....₩ ℔ 14c
Wright's.....₩ ℔ gold 12c; over 250 ℔s 12½c, gold
Armitage's Mouse Hole.....gold 11c
Wilkinson's.....₩ ℔ gold 11½c
Eagle Anvils, ₩ ℔ 11c currency.....dis 15 @ 15&5 %

Apple Parers.
Turn Table, Lightning, Conqueror.....$8·50 ₩ doz
Reading.....₩ doz $ 00
Union.....₩ doz 9 00
Bay State, Paring, Coring and Slicing.....15 00 | dis
Skeleton " " " .....9 00 | 5 %
Climax Slicer.....9 00
Bay State Peach Parer.....$11 00 @ 11 50
Lightning " " .....11 00 @ 11 50
Peach Stoner and Halver.....7 00

Augers and Bits.
Snell Mfg. Co.....dis 15 @ 20 %
Russell Jennings.....dis 10 %
Douglass Mfg. Co., Extra.....
" " No. 1.....
" " Hollow Augers.....
Cushman's Expanding Hollow Augers.....dis 20 %
Ives' Augers and Bits.....dis 30&10 %
" Gouge Lip Augers and Bits.....dis 30&10 %
" Hollow Augers.....dis 30&10 %
" Expansive Hollow Augers.....dis 30&10 %
" Expansive Bits.....dis 20&10 %
Andrews' Bits.....dis 25 %
Cook's Patent Augers.....dis 50 %
" " Bits.....dis 40 %
Shepardson's Double Cut Bits.....dis 20 %
Griswold's Patent.....dis 30 %
Caststeel Cut Augers.....dis 30&10 %
" Auger Bits.....dis 30&10 %
Long Augers.....new list dis 30 %
Bonney's Patent Hollow.....$48 per doz—dis 25 %
Stearns' " " .....$48 per doz—dis 25 %
Morse's Bit Stock Drills.....dis 20 %
Nobles Mfg. Co. C. S. Cut Augers.....dis 30&10 %
Watrous Snap Augers.....dis 10 %

Axes.
Blood's.....$12 50 @ 14 00
Hunt's.....₩ doz $15 00 @ 17 50 net 60 dis 5 %
Collins'.....₩ doz 11 00 @ 16 00 net 60 dis 5 %
Hurd's.....₩ doz 12 50 @ 13 50
Schweitzer Mfg. Co.'s.....₩ doz 13 00 @ 15 00
Simmons'.....₩ doz 12 50 @ 14 00
Morris'.....₩ doz 12 50 @ 13 50
Red Jacket.....₩ doz 12 00 @ 12 50
Maun's.....₩ doz 12 50 @ 13 00
Double Bitted.....₩ doz 21 50 @ 22 00
Powell Tool Co., "Peerless".....₩ doz 13 00 @ 14 50
Underhill's.....₩ doz 12 50 @ 13 50
" Crown.....₩ doz 13 00 @ 14 00
John Leverett's.....₩ doz 12 50 @ 15 50
Nobles Mfg. Co. S. B.....₩ doz 12 50 @ 13 00
" " D. B.....₩ doz 22 00 @ 23 00

Balances.
Chatillon's, Frary's, Morton's.....new list dis 15 %

Bands.
Plated.....new list dis 50&5 %
Iron Rim.....new list dis 15&5 %
Brass (Plated list).....new list dis 50, 10&5 %
Oroide.....new list dis 50&5 %

Bells.
Hand, Light Brass.....dis 60&10 @ 65&10 %
White Metal.....dis 45&10 %
Globe.....dis 15&10 %
Adobe's.....dis 10&10 %
Taylor's Patent Door.....net
Western Gong.....net
Brook's Crank.....dis 10 %
" Pull.....dis 15&10 %
Hart Mfg. Co., Crank and Pull.....dis 50&10 %
Cow—Common Wrought.....dis 20&10 %
Western.....new list dis 20&10 %
Kentucky "Star".....new list dis 20&10 %
Dodge's Genuine Kentucky.....new list dis 25 %
Yaw's Genuine.....dis 20 %

Bellows.
Blacksmiths'.....dis 15 %
Moulders'.....dis 15 %
Hand Bellows.....dis 10 %

Blind Fasteners.
Van Sand's.....₩ gross $14 00
Washburn's Patent.....₩ gross 14 00
Merriman's.....

Blind Staples.
Boardman's Patent, ½ in. and larger.....₩ ℔ 37 c
" ⅝ in....." 42 c

Bolts.
Carriage and Tire, Ætna Nut Co.....dis 60 %
Stove, Ætna Nut Co.....dis 10&5 %
Cast Iron Barrel, Shutter, &c.....old list dis 35&10 %
Wrought Iron Barrel.....new list dis 50&10 %
" " Square.....new list dis 50&10 %
Carriage and Tire, Common.....dis 70&10 %
" " " Norway Iron.....50&10 %
Star, Philadelphia.....dis 50 @ 50&10 %
Eagle, Philadelphia.....dis 50 @ 50&10 %
Skelly's Phila. Norway Iron Finished Points...dis 50&5 %
Philadelphia Pattern, P. S. & W.....dis 50&10 %
Carriage and Tire, R. B. & W.....old list dis 50&5 %
Plow, R. B. & W.....dis 30 %
Stove, R. B. & W.....dis 10 %
" Shelton Co. Shaved Heads.....dis 15 %
Union Nut Co., old list.....dis 30&2½ %
" " Stove.....dis 15 %
Machine.....dis 30&10 %

Borax.—In cases of 100 lbs.....₩ ℔ 20c
In barrels.....₩ ℔ 19c

Boring Machines.
Kellogg's.....dis 15 %
Snell Mfg. Co., Rice's Patent.....dis 15 %
" " Regular.....dis 15 %
Douglass Mfg. Co.....dis 20 %
Morticing Machines each.....$18 00

Bow Pins......dis 50 %

Braces.
Barber's Patent.....dis 40 %
Wilson Mfg. Co.....new list dis 10 %
Spofford's Patent.....dis 40 %
Noble's Patent.....dis 40 %
Bartholomew's American Ball.....dis 10&10 %
" " Patent Grip.....dis 40 %
O. S. Backus & Co.....dis 30&10 %
Ives' Novelty.....dis 40 %
Empire.....dis 33&10

Bull Rings......dis 50 %

Bung Hole Borers.
Common and Ring.....dis 25 %
Enterprise Mfg. Co.....dis 20&10 %
Ives' Tap Borers.....dis 25 %

Butchers' Cleavers.
Bradley's.....dis 25 %
Beatty's.....new list dis 10 %

2	3	4	5	6	7	8	9
$19·00	$21·50	$24·00	$27·00	$30·00	$33·50	$36·50	$40·00

Hart Mfg. Co.....dis 45&10 %

0	1	2	3	4	5	6
$25·25	$29·75	$33·25	$38·75	$43·25	$49·50	$54·00

Butts.
Wrought Brass.....new list dis 30 %
Cast Fast Joint, Narrow.....dis 50 %
" " Broad.....dis 50 %
Cast Loose Joint.....dis 60 %
" " Mayer.....dis 50 %
" " Parliament.....dis 50 %
Loose Pin.....dis 40&10 %
Wrought Fast Joint, Narrow.....dis 30 %
Wrought Broad.....dis 35 %
" Loose Joint.....dis 35 %
Wrought Table and Back Flaps.....dis 30 %
Palmer Blind Butts.....dis 30&10 %
Nicholas Blind Butts.....dis 40&10 %
Parker's Blind Butts.....dis 45&10 %
Cherritree Blind Butts for wood.....dis 50 %
A. S. Parker's.....dis 40&10 %
Clark's Surface Blind Hinges, Nos. 1, 3 and 5.....dis 50 %
" " " No. 20.....dis 55&10 %
" Mortise " " .....dis 30&5 %
Seymour's.....dis 40&10 %
Sheppard's.....dis 50 %
Garretson's.....dis 60 %
The American Spiral Spring Butt Co.....dis 20 %
Standard.....dis 40&10 %
Union Mfg. Co.—
Drilled and Wired Cast Fast.....dis 35 %
" " " Loose.....dis 50 %
Loose Joint Japanned or Silvered Acorn.....dis 45 %
" " Nickel Capped.....dis 40 %
" " Solid Bronze.....dis 30 %
" " Solid Bronze.....dis 10 %

Caps—Percussion, per 1000.
G. D.....40c
Ely's E. B.....1-4s, 55c.; 1-10s, 65c., gold
" Double Waterproof, 1-4s, $1·45; 1-10s, $1·52½c., gold
" Colt's.....1-10s, 70c., gold

Cartridges.
Metallic.....dis 50 @ —%

Cards.—Horse and Curry.....dis 25&10 %
Cotton.....new list dis 10&10 %
Wool.....new list dis 10&10 %

Casters.
Iron and Wood Wheel, Bed.....dis 30&10 %
Brass and Porcelain Wheel, Bed.....dis 30&10 %
Deep Socket, Bed.....new list dis 30&10 %
Iron and Wood Wheel Plate.....new list dis 30&10 %
Brass Wheel Plate.....new list dis 33&10 %
Porcelain Wheel Plate.....new list dis 30&10 %

Cattle Leaders......dis 50&10 %

Chain

English Coil, by the cask							net gold
₩ ℔	13¾	10	9¾	8¾c	8¾	8¾c	
	3-16		¼	5-16	⅜	7-16	½
Trace, 6½-10-2							₩ pair, gold, 65c
Trace, 7-10-2							₩ pair, gold, 70c
Galvanized Pump Chain							₩ ℔ 14c
German Halter Chain							new list, Jan. 1, dis 10 %
German Coil							new list, Jan. 1, dis 10 %
Jack Chain, Iron							dis 50 %
" Brass							dis 40 %

Chalk.
White.....₩ gross, 50c
Red.....₩ gross, 75c
Blue.....₩ gross, 90c
Crayons.....₩ gross, 14c

Cherry Stoners.
"Family".....₩ doz $9·00

Chisels.
Socket Firmers.....dis 50&10 @ 60&10 %
Socket Framing.....dis 60 @ 60&10 %
Socket Corner.....dis 60 %
Tanged Firmers.....dis 40 to 40&10 %
Butcher's.....$5·50 to £ gold—new list
Newbould's.....$5·50 to £ gold
Spear & Jackson's.....$5·50 to £ gold—new list

Clips, Axle.
Norway or Best.....dis 25 %
Superior.....dis 50 %
"Star," Superior Philadelphia.....dis 45&5 %

Coal Shovels.
Iron Handled.....₩ doz, $ 85 @ 1 25
Wooden Handled.....₩ doz, 1 00 @ 2 00

Coal Hods.—Smith, Burns & Co.....dis 35 %

	No. 14	15	16	17	18	
Japanned	$9·00	9·75	10·50	12·00	13·50	per doz
Galvanized	13·00	14·50	15·50	17·50	19·50	"

Morning Glory.....dis 30 %

	No. 15	16	17	
Japanned	$12·50	13·50	15·50	per doz
Galvanized	18·00	19·50	21·00	"

Cocks.
Brass Racking.....dis 25&10 %
Lock and Globe.....dis 25&10 %

Coffee Mills.
Board and Box.....dis 15 %
Increase Wilson's.....new list dis 15 %
Selsor's Pat.....$9·50, $10·50—dis 20 %
French Steel.....dis 15 %
American.....dis 20 %
Swift's.....dis 20 %

Compasses and Dividers.
Bemis.....dis 35 %
Excelsior.....dis 30 %
Peck Stow & Wilcox.....dis 25 %

Coopers' Tools.
Bradley's.....dis 15 @ 20 %
Chas. E. Little.....dis 15 @ 20 %

Corn Knives and Cutters.
Bradley's.....dis 10 %

Crucibles.
Gautier & Co.....₩ No. 5¼c

Curry Combs.
Hotchkiss' and Kellogg's, Iron and Brass.....dis 15 %
Fitch's.....dis 20 %
Ruggles'.....dis 15 @ 20 %
Rubber.....₩ doz, $9·00—dis 10 %
Schweitzer Mfg. Co.....dis 20 %

Curtain Pins.
Silvered Glass.....dis 40&10 %

Cutlery.
American Table.....
American Pocket.....dis 25 %

Dog Collars.
Embossed Gilt.....dis 10 %
Leather.....dis 20 %

Door Springs.
Gray's.....$7·50 per doz—dis 40&10 %
Torrey's Patent.....$7·50 ₩ doz—dis 40&10 %
Palmer's Japanned No. 6.....₩ doz $5·00
" Copp ered " .....6·00
" Silvered " .....8·00

Drills, Axle.
Norway or Best.....dis 25 %
Superior.....dis 50 %
"Star," Superior Philadelphia.....dis 45&5 %

Coal Shovels.
Iron Handled.....₩ doz, $ 85 @ 1 25
Wooden Handled.....₩ doz, 1 00 @ 2 00

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Gray's.....$7·50 per doz—dis 40&10 %
Torrey's Patent.....$7·50 ₩ doz—dis 40&10 %
Palmer's Japanned No. 6.....₩ doz $5·00
" Co ppered " .....6·00
" Silvered " .....8·00

Drills, Axle.
Ingersoll's Ratchet.....dis 25 %
Moore's Triple Acting Ratchet.....dis 20 %
Whitney's Ratchet.....dis 20 %

Drug Mills.
American Drug Mills.....dis 20 %

Egg Beaters.
Monroe's.....₩ doz net $6·25 @ 9·50
Earle's Patent.....₩ doz net 5·50 @ 6·00
Dover.....₩ doz net $6·00
National.....₩ doz $4·50—dis 10 %
Peerless.....₩ doz net $4·00

Emery.
Genuine Chester—Regular Nos.....₩ ℔ 7c
" Flour and FF.....₩ ℔ 4c } dis 5 @ 10 %
Washington Mills—Regular Nos.....₩ ℔ 8c
" Flour.....₩ ℔ 5c

Enameled and Tinned Ware.
Kettles.....dis 20 @ 25 %
Sauce Pans, Glue Pots, &c.....dis 15 %

Fanceus.
Cork Lined, Wood.....dis 60 %
Fenn's.....dis 50 %
" Cork Stops.....dis 40 %
Star.....dis 55&10 %
Frary's Patent Petroleum.....dis 10&10 %
Taylor's Pattern " .....dis 20&10 %
Wood and Metallic.....dis 40 %

Files.
Nicholson.....$5 00 to £ currency—dis 10 %
Newbould's.....5 25 to £ gold
J. & Riley Carr's.....5 50 to £ gold
" " Rasps.....5 75 to £ gold
Stubs'.....8 50 @ 9 00 to £ gold
Butcher's.....5 50 to £ gold
Walter Spencer & Co.'s "Diamond".....5 25 to £ gold
Spear & Jackson's.....5 50 to £ gold
Hargreaves, Smith & Co.'s.....5 00 to £ gold
Jowitt's.....5 25 to £ gold
"Western".....5 00 to £ net
W. K. & C. Peace's "Imperial".....5 25 to £ gold
R. Ibbotson.....5 00 to £ gold
Beam & Murray, "Cyclops".....4 85 to £ gold
Fisher's.....4 75 to £ gold
Goodlad's.....4 00 to £ gold
Moss & Gamble.....5 25 @ 5 50 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.).....5 00 to £ gold
" " Horse Rasps.....5 50 to £ gold

Fluting Machines.
Acme.....$7 00 each net
Manville, No. 2.....7 00 eaca net
Knox, with 4-inch Rolls.....5 00 each net
" " 5 " .....6 00 each net
O. K.....6 50 each net
Peerless, 4-inch Rolls.....4 00 each net
" 5 " .....5 00 each net
Excelsior, No. 1.....4 75 each net
" No. 2.....6 50 each net
Diamond.....7 50 each net
Climax 7-inch Rolls.....8 00 each net
" 4½ " .....6 50 each net
Empire.....4 00 each net
Eureka, No. 1, 7-inch Roll.....5 00 each net
" No. 2, 5-inch Roll.....6 00 each net
K. F. M., 4½-inch Roll.....5 50 each net
" 4-inch Roll.....6 00 each net
Myers' Fashion Fluter, 4½ inch Rolls.....3 00 each net
" Convex Brass Fluter, Sad Iron attachment...$1·75
Domestic Fluter.....$1·75 each net
Fairy, Self-Heater.....8 00 each net
National, 5-inch Rolls.....5 00 each net
Ponton Fluter, Bright.....$1 50—dis 25 %
" " Galvanized.....2 00—dis 25 %
Geneva Hand Fluter.....$15 00 per doz net
Champion, 6 inch rolls.....$6 00 each net

Fry Pans.—P. S. & W.
Tinned.....dis 25 %

₩ doz.....	$3·00	3·25	3·62	4·00	4·50	5·00	5·50	6·00	7·50
No.....	1	2	3	4	5	6	7	8	

Smith, Burns & Co., "Excelsior" Polished.....dis 30 %

₩ doz.....	$3·75	4·00	4·75	5·25	6·00	7·00	8·00	9·00
No.....	1	2	3	4	5	6	7	8

Hammers.
Emmet Hammer Co.....dis 10 %
Maydole's.....dis 5 %
Cheney's.....new list net
Verree.....dis 5 %
Yerks & Plumb.....new advanced list dis 5 @ 10 %
Minot & Co.....dis 15 %

Handles.
Hammer and Hatchet.....dis 10 %
Quakertown, Axe, Pick and Sledge.....dis 10 %
" Hammer and Hatchet.....net
Greensboro', Axe, Pick, Hammer, &c.....dis 10 %
Woolworth Axe, Pick and Sledge.....dis 10 %

Harness Snaps.
Judd's.....dis 40 %
Fitch's.....dis 30 %
Hotchkiss'.....dis 10 %
Andrews'.....dis 25 %
Sargent's.....new list dis 50&10 %

Hatchets.
Isaiah Blood.....dis 10 %

Shingling, Nos. 1 2 3.....	₩ doz	$7 50	8 00	8 50
Claw, " 1 2 3.....	₩ doz	8 50	9 00	9 50
Lathing, " 1 2 3.....	₩ doz	7 50	8 00	8 50

Hunt's.....net

Shingling, Nos. 1 2 3.....	₩ doz	$7 25	8 00	8 75
Claw, " 1 2 3.....	₩ doz	7 75	8 50	9 25
Lathing, " 1 2 3.....	₩ doz	7 50	8 25	9 00

Hurd's.....dis 20 %

Shingling, Nos. 1 2 3.....	₩ doz	$8 00	8 50	9 00
Claw, " 1 2 3.....	₩ doz	9 00	9 50	10 00
Lathing, " 1 2 3.....	₩ doz	8 00	8 50	9 00

Newark's Edge Tool Co.'s.....dis 25 %

Shingling, Nos. 1 2 3.....	₩ doz	$6 50	7 00	7 50
Claw, " 1 2 3.....	₩ doz	7 25	7 75	8 25
Lathing, " 1 2 3.....	₩ doz	6 50	7 00	7 50

Yerks & Plumb.....dis 10 %

Shingling, Nos. 1 2 3.....	₩ doz	$7 00	7 50	8 00
Claw, " 1 2 3.....	₩ doz	7 50	8 00	8 50
Lathing, " 1 2 3.....	₩ doz	7 00	7 50	8 00

Simmon's.....dis 10 %

Shingling, Nos. 0 1 2 3.....	₩ doz	$7 50	8 00	8 50	9 00
Claw, " 1 2 3.....	₩ doz		9 00	9 50	10 00
Lathing, " 1 2 3.....	₩ doz		8 00	8 50	9 00
Broad, " 1 2 3.....	₩ doz		9 00	10 00	12 00
" " 4 5 6.....	₩ doz		14 00	16 00	18 00
" " 7 8.....	₩ doz		20 00	22 00	

Elephant.....dis 25 %

Shingling, Nos. 1 2 3.....	₩ doz	$8 00	8 50	9 00
Claw, " 1 2 3.....	₩ doz	9 00	9 50	10 00
Lathing, " 1 2 3.....	₩ doz	8 00	8 50	9 00

J. P. Verree & Co.....dis 5 %

Shingling, Nos. 1 2 3.....	₩ doz	$7 00	7 50	8 00
Claw, " 1 2 3.....	₩ doz	7 50	8 00	8 50
Lathing, " 1 2 3.....	₩ doz	7 00	7 50	8 00

Underhill's.....dis 10 %

Shingling, Nos. 1 2 3.....	₩ doz	7 25	8 00	8 75
Claw, " 1 2 3.....	₩ doz	7 75	8 50	9 25
Lathing, " 1 2	₩ doz	11 00	12 00	

Hinges.
Wrought Strap and T.....dis 25&7½ %
Providence Plate. { 6 and 8 in. list 11c. / over 8 in. list 9½c. } dis 10&5@10&10 %
Screw Hook and Strap..... { 8, 10, 12, 28 in. 8½c / 14 to 26 in. 9c } ....net
Heavy Welded Hook..... { 8 to 12 in. 9c / 14 in & up, 8½c } dis 50 %
Screw Hook and Eye..... { ⅝ to 1 in., 9½c / ⅜ in. 10½c / ⅛ in. 12½c } ....net

Hoes.
Solid Shank, C. S.....₩ doz $8 00—dis 20 @ 30 %
Socket.....₩ doz 9 00—dis 20 @ 30 %
Riveted Eye.....₩ doz 5 00—dis 20 @ 30 %
Grub.....dis 20 %
Planters'—Winsted.....add 10 %
Scovill.....add 83½ %
Scovill Pattern (Winsted).....add 20 %

Hooks.
Belt.....dis 50 %
Bench—Hotchkiss' $5 00 ₩ doz.....dis 10 %
Bench—Weston's No. 1, $8·50; No. 2, $7·00 per doz net
" —McGill's.....$3 00 per doz, dis 10 %
Wardrobe, Japanned.....new list dis 55&5 %
Hat and Coat " .....new list dis 55&5 %
Wrought Staples and Hooks and Staples.....dis 60&10 %
Screw Hooks and Eyes, revised list.....dis 50 %

Horse Nails.
Putnam's.

No.	5	6	7	8	9	10
	32c	28c	26c	25c	24c	23c

In lots 2000 lbs. dis. 5 %.
Ausable

No.	5	6	7	8	9	10
	30c	27c	25c	24c	23c	22c

Pointed & finished..31c 28c 26c 25c 24c 23c
In lots of 1000 lbs. 5 % discount.
Brundage.

No.	5	6	7	8	9	10
	29c	26c	24c	23c	22c	21c

In lots of 500 lbs., dis. 5 %.
American Pressed.

No.	5	6	7	8	9	10
	32c	29c	26c	30c	29c	30c

In lots of 1000 lbs. dis 5 %.
Perkins Finished (ready to drive).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs. dis 5 %.
Buffalo Forged.

No.	6	7	8	9	10
	28c	26c	25c	24c	23c

Globe (Pointed and Polished).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs., 5 % discount.
National (Pointed and Polished), Extra Finish.

No.	5	6	7	8	9	10
	30c	27c	25c	24c	23c	22c

In lots of 1000 lbs., dis 5 %.
Vulcan (Blued, pointed, ready to drive).

No.	5	6	7	8	9	10
	33c	30c	28c	27c	26c	25c

In lots of 500 lbs., 5 % discount.
" 1000 lbs 1½ % discount.
New London Horse Nails.

No.	6	7	8	9	10
Great Western	27c	25c	24c	23c	22c
U B	29c	27c	26c	25c	24c

In lots of 1000 lbs., dis 5 %.
Star Brand.....₩ ℔ 16c
Morgan.....14c

Horse Shoes.
Burden.....₩ keg, $5 8½
R. I. Horse Shoe Co., Perkins Pattern.....₩ keg, 5 8½
" " R. I. Pattern.....₩ keg, 6 8½
Mule Shoes.....₩ keg, 6 8½

Kettles.
Brass.....₩ ℔ 55c net
In lots of 500 ℔s.....₩ ℔ 50c net

Knives.
Ames' Butcher Knives.....dis 20 %
" Shoe " .....dis 20 %
Hay and Straw, "Wadsworth's".....dis 20 %

Knobs.
Base—Common.....net
" Plush Tip.....dis 10 %
" Elastic End.....reduced list dis 10&10 %

Ladles.
Melting.....dis 20 %

Lanterns.
Brady's Patent.....dis 10 %
Ætna.....dis 10 %
Yankee.....dis 10 %
De Beque.....dis 10 %

Locks and Latches.
Cabinet—Eagle.....dis 25 %
Cabinet—Gaylord.....dis 25 %
Trunk.....dis 10 %
Continental.....dis 15 %
Shepardson's.....dis 20 %
Trenton Lock Co.
Branford.
Norwich.
Russell & Erwin.
Norwalk.
Nashua.
Mallory, Wheeler & Co.
} New list dis 45 %. 2 % extra for cash.

Mallets.
Hickory and Lignumvitæ.....dis 10&10 %

Meat Cutters.
Dixon's (P. S. & W.).....dis 10 %

No.	1	2	3	4
₩ doz.	$14 00	$17 00	$19 00	$30 00

Hales'.....dis 25 %

No.	11	12	13
₩ doz	$27 00	$33 00	$40 00

Miles Challenge.....dis 20 %

No.	1	2	3
₩ doz.	$32·00	$30·00	$40·00

Perry's Champion (P. S. & W.).....dis 10 %

No.	200	300	400
₩ doz.	$22 00	$27 00	$40 00

Woodruff's (P. S. & W.).....dis 10 %

No.	100	150
₩ doz.	$15 00	$19 00

American.....dis 25 @ 25&5 %

No.	1	2	2½	3	4	5
Each	$6 00	$9 00	$14 00	$15 00	$30 00	$75 00

Molasses Gates.
Stebbins' Pattern.....dis 60&10 %
Tinned ends.....dis 40&10 %
Weed's Patent Self-Boring.....dis 15 %
" without Auger Bit.....dis 40 @ 50 %
Patent Self-Measuring.....per doz $47 00—dis 20&10 %

Mouse Traps.
Wood Choker.....₩ doz holes, 16 @ 18c

Nails.—See Trade Report.

Nuts and Washers.
Nuts.....large, 5½c; small, 7½c off list.
Washers.....large, 1c; small, 9c off list.

Oil Stones.
Washita No. 1.....₩ ℔ 22c
" Slips.....₩ ℔ 44c
Hindostan.....₩ ℔ 6c dis 10&10 %
" Slips.....₩ ℔ 10c dis 10&10 %

Oilers.
Olmsted's.....new list dis 25&10 %
Broughton's.....dis 25&5 %
Common Tin.....dis 30 %
" Zinc.....dis 30 %
" Brass and Copper.....dis 30 %

Picks.
Wasnoe R. R....dis 25 %....Nos. 1 2 3 4 5

₩ doz.....	$14·00	15·00	16·00	17·00	18·00

Washoe Coal, dis 20 %....$8·50 9·00 10·00 11·00 13·00 15·00

Picture Nails and Knobs.
Richards' Patent.....dis 40 @ 40&10 %

Planes.
Chapin's, 1st quality.....dis 30 %
Sandusky Tool Co., 1st quality.....dis 30 %
" " 2d " (Ogeeta).....dis 40 %
Ohio Tool Co., 1st quality.....dis 30 %
" " 2d quality (Sciota).....dis 40 %
Owasco Tool Co., 1st quality.....dis 30 %
" " 2d quality.....dis 40 %
Howland's, 1st quality.....dis 30 %
Bailey's Patent.....dis 20&10 %
Plane Irons, Butcher's.....$5 50 to £ gold—new list
" Chapin's.....dis 10&10 %
" Ohio Tool Co.....dis 10 %
" Spear & Jackson's.. 5 50 to £ gold—new list
" Sandusky Tool Co.....dis 10 %

Plumbs and Levels.
Chapin's.....dis 60&10 %
Standard Rule Co.'s New Adjustable.....dis 50&10 %
Stanley Rule and Level Co.....dis 60&10 %

Pumps.
Douglas Cistern, etc.....new list dis 25 %
" S. & F.....new list dis 20 %

Rakes.
Cast Steel.....dis 30 %

$8 00	9 00	10 00	11 00
9	10	12	14 teeth.

Razor Straps.
Genuine Emerson.....dis 25 %
" " In 5 gross lots.....dis 30 %

Rivets.
Iron and Tinned.....dis 25 %
Copper Rivets and Burrs.....new list dis 10 %

Rods.
Steel.....new list dis 30 %
American Patent.....dis 30 %

Rope. Manufacturers' List
Manila.....½ inch and larger ₩ ℔ 16½c
" .....⅜ inch ₩ ℔ 17 c
" .....¼ and 5-16 inch ₩ ℔ 17½c
" Lath Yarn.....₩ ℔ 16 c
" Hay Rope.....₩ ℔ 17 c
Sisal.....½ inch and larger ₩ ℔ 15½c
" .....⅜ inch ₩ ℔ 16 c
" .....¼ and 5-16 inch ₩ ℔ 16½c
" Hay Rope.....₩ ℔ 16 c

Rules.
Chapin's Boxwood.....dis 60&10 %
" Ivory.....dis 50&10 %
Hubbard & Curtiss Mfg. Co.....new list net
Stanley Rule and Level Co.'s Ivory.....dis 50&10 %
" " Boxwood.....dis 60&10 %
Standard Rule Co.'s Boxwood.....dis 60&10 %
" " Ivory.....dis 50&10 %

Sad Irons.
Sad Iron, Nickel Stand attached.....₩ ℔ 9c

Sand Paper—dis 7½ @ 10 %
Beader & Adamson's (Flint) 00 to 1½.....$4 25 ₩ ream
" " " 2, 2½, & 3.....4 75 "
Assorted.....4 25 "
Star.....₩ ream $3 25
Emery.....₩ ream $6 50 @ 11 50
Cowdin Mfg. Co.....dis 7½ @ 10 %
Diamond Flint, 00 to 1½.....per ream $4 25
" 2, 2½, 3 and assorted.....4 75
" Emery Paper.....per ream $6 50 to $11 50

Sash Locks.
Clark's.....dis 20 %
Ferguson's.....dis 20 @ 25 %
Norwich.....dis 15 %

Sash Weights.
Solid Eyes.....₩ ℔ 2½c

Sausage Fillers.
Perry's (P. S. & W.).....dis 10 %

No.	1	0
₩ doz.	$15 00	$21 00

Saw Rods......dis 10 %

Saws.
Spear & Jackson's.....$4 50 to £ gold
John Spear.....$3 60 to £ gold
Am. Saw Co.....new list
Perforated Cross Cuts, all kinds.....68c ₩ foot
Inserted Tooth.....dis 10 %
All else.....dis 12½ %
Disston's.....dis 12½ %
H. W. Peace's Circulars.....dis 10 %
Other kinds.....dis 10 %
Wm. McNiece's Hand, Cross Cut and Circular.....new list dis 10 %
E. M. Boynton's Lightning, dis 30&5 % for immediate cash
" " Others.....dis 15 %

Scales.
Turnbull's.....dis 15 %
Brown's.....dis 25&5 %
Fairbanks'.....new list dis 15 @ 20 %
Howe's.....dis 15&5 %
Shattuck's Counter and Union.....dis 15 %
National Platform.....dis 25 %
Eureka.....dis 25 %
Scale Beams.....dis 25 %
No. 1 300 to 1200 lbs.....90c ₩ cwt
No. 2 " " .....75c ₩ cwt

Screws.
American list of Jan. 1, 1874.
Flat Head Iron.....dis 52½ %
Round Head Iron.....dis 50 %
Flat Head Brass.....dis 52½ %
Round Head Brass.....dis 50 %
Round Head Silver Capped.....dis 25&10 %
Hand Rail.....dis 10 %
Coach or Lag.....dis 30&10 %
Coach, Patent Gimlet Point.....dis 5 %
Bed.....list net
English—Nettlefold & Chamberlain's Flat Head Iron.....dis 52½&10 %
Machine—Flat Head, Iron.....dis 60 %
" " Brass.....dis 10 %
Round Head, Iron.....dis 55 %
" " Brass.....net
Bench—Iron, Wilson's.....dis 20 %
" —Wood.....dis 15 %
Hand.....dis 25&10 %
Jack—Bell Bottom.....dis 15 %

Scythes.
Blood's German Steel, Grass.....₩ doz $9 00
" Cast " " .....₩ doz 10 00
" Silver " " .....₩ doz 11 00
" German " Grain.....₩ doz 13 00
" Cast " " .....₩ doz

Scroll Iron—¼ x 13	"	132 50
" ⅜ x 10	"	122 50
" ⅜ x 8-16	"	127 50
" ⅜ x ¼	"	122 50
" ½ x 11	"	132 50
" ½ x 13	"	120 00
" ½ x 10	"	117 50
" ½ x 8-16	"	115 00
" ½ x ¼	"	112 50
" ⅝ x 13	"	115 00
" ⅝ x 10	"	112 50
" ⅝ x 8-16	"	110 00
" ⅝ x ¼	"	107 50
" ¾ x 14	"	
" ¾ x 12	"	110 00
" ¾ x 10	"	107 50
" ¾ x 8-16	"	105 00
" ¾ x ¼	"	102 50
" ⅞ x 11	"	120 00

Sheet Iron.

		Common English.	R. G. American.
Nos. 10 to 20	₩ lb	4½ @ 4¾c	6c
21 to 24	"	5 @ 5¼c	6½c
25 to 26	"	5½c	6¾c
27	"	6¼c	7c
28	"	6c	7¼c
30	"	7¼c	
Galvanized, 10 to 20, prime	₩ lb		11c
" 21 to 24	"		12c
" 25 to 26	"		13c
" 27	"		14c
Patent Polished	"		15c
Russia, Nos. 8 to 11	₩ lb		19c
" Nos. 12 to 16	"		19c
" Stained, No. 1	"		17½c
Belgian	"		

One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON

4½	5	5½	6	7 inch.
$3·75	4·25	5·25	5·25	6·50 per doz.

RUSSIA IRON.

4½	5	5½	6	7 inch.
$8·00	10·00	13·00	13·00	14·00 per doz.

Adjustable Stove Pipe Elbows.

CHARCOAL IRON.

4	4½	5	5½	6	7 inch.
$3·25	3·75	4·25	4·75	5·25	6·25 per doz.

RUSSIA IRON.

4	4½	5	5½	6	7 inch.
$7·00	8·00	9·50	10·75	11·75	13·75 per doz.

Discount on orders of 10 doz. 5 %.
" " " 25 doz. 10 %.

Brass.

ROLLED AND IN SHEETS.
(Brown & Sharp's Gauge.*)
For the purchase of 100 pounds and over at one time

HIGH BRASS.

All Nos. to No. 28, and widths 14 in. and under.....34c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in. inclusive.....37c
Over 20 in. to 30 in. inclusive.....40c
½c ₩ lb advance on each No. above No. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass at.....53c
Sheets 24x48 in., and all sheets cut to particular sizes and lengths.....40c
Printers' Rules.....44c
Sheets wider than 30 in. and under 40 in.....44c
" 40 in. and over.....46c
Circular sheets, in diam. from 4 in. to 14 inclusive....41c
" " " over 14 in. to 20 " 47c
" " " " 20 in. to 30 " 50c
" " " " 30 in. to 40 " 53c
" " " " 40 in.....56c
Brass Rods above No. 0, and under 1 in.....43c
" " 1 in. and over.....47c

LOW BRASS.

4c ₩ lb more than High Brass.
Gilding Metals, 7c ₩ lb more than High Brass.
Platers' or Gold Metal ½ in Bars.....46c
" ¼ Sawed.....49c

FOR SLITTING: Metal in Width.

2 in. to ½ in., to No. 30, inclusive, 1c ₩ lb advance.
2 in. to ¼ in., thinner than No. 30, 2c ₩ lb advance.
2 in. to ⅛ in., " " 30, 3c " "
½ in. and less to No. 30, 2c ₩ lb advance.
½ in. and less thinner than No. 30, 5c ₩ lb advance.
10 % discount.

SCRAP—NEW METAL.

High Brass Scrap, 17 cents, net.
Low " 19 " "
Gilding, 21 cents, net.
Turnings, Filings and Chips, half the price of Scrap Net.

BRASS AND COPPER WIRE.
(Stub's Wire Gauge).

	High Brass.	Low Brass.	Gild'g and Cop'r
Nos. 0 to 20	37	41	47
Nos. 21, 22, 23	38	42	48
Nos. 24 and 25	39	43	49

Brass Wire straightened and cut, 4 cents advance
10 % discount

FINE WIRE—NET PRICES.

	High Brass.	Low Brass.	Gild'g and Cop'r.
No. 26	0·41	0·45	0·51
No. 27	0·44	0·48	0·54
No. 28	0·46	0·50	0·56
No. 29	0·48	0·52	0·58
No. 30	0·50	0·54	0·62
No. 31	0·52	0·56	0·36
No. 32	0·56	0·60	0·71
No. 33	0·60	0·64	0·81
No. 34	0·64	0·68	0·91
No. 35	0·69	0·73	1·03
No. 36	0·76	0·84	1·15
No. 37	0·98	0·18	1·28
No. 38	1·28	1·28	1·58

Ten cents per pound extra for Spooling.

TUBING.
(Brown & Sharpe's Gauge.)

	₩ lb
Plain to No. 20, inclusive	$0·52
Nos. 21, 22, 23, 2c. advance on List for each No.	
Nos. 24, 25, 26, 4c. " " "	
Above No. 26 special rates.	
Plain Tube, 1-4 inch	68
" 3-16 "	1 38
" 1-8 "	1 78

All Mandrel-Drawn Tubes 5c. advance on List.
Fancy Tubing 4c. advance on List above Plain.
English, Scotch, and Extra Patterns Fancy Tubing to No. 20. 61
Tubing sawed or cut 2 to 4 ft. long, 2c. advance on List.
Add to two cents a half-cent for each additional cutting under two feet. 10 % discount.
BRASS DOOR RAIL—48 cents per lb.—10 % dis.

BELT AND HOSE COPPER RIVETS AND BURS.

Price per lb	49	50	52	54	56	58	60	64	68c
Nos.	7	8	9	10	11	12	13	14	15

Brazier's Rivets, 43 cents per pound discount 10 %.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire
4 per cent. 12 inch. to No. 26	0·75	0·90
6 " " "	0·85	1·00
10 " " "	1·05	1·25
15 " " "	1·30	1·55
18 " " "	1·45	1·75
20 " " "	1·55	

Discount 10 %.
German Silver Sheet over 12 inches wide and weighing more than 10 lbs. $2·10 ₩ lb net
Advance two cents for each additional inch in width above 12 inches, and two cents per pound on each No. thinner than Nos. 26 to 36, inclusive.
All German Silver thinner than No. 36 is Platers' at 50 cents per pound additional.
German Silver Scrap, one-third less than net price of 12 inch Market Metal; German Silver Turnings, Filings and Chips, half the price of Scrap.
* Brown & Sharp's Gauge is about two numbers finer than Stubs' Wire Gauge.

COPPER—DUTY: Pig, Bar and Ingot, 5c.; old copper, 4 cents ₩ lb; Manufactured (including all articles of which copper is a component of chief value) 45 % ad Valorem. All subject to a reduction of 10 per cent.

American Ingot	₩ lb	26 @ 26½c
English "		

SHEATHING, BRAZIERS COPPER, BOLTS, &C.

Braziers Copper, ordinary sizes, over 16 oz., per square foot		35c ₩ lb
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot		38c. "
Braziers Copper, 12 oz. per square foot and lighter		41c. "
Circles less than 24 inch in diameter		36c. ₩ lb
Circles, 24 inch diameter and over		41c. "
Segment and Pattern Sheets		38c. "
Locomotive Fire Box Sheets		35c. "
Sheathing Copper, over 12 oz. per sq. ft.		33c. "
" 12 oz. ₩ sq. ft. and lighter		41c. "
Bolt Copper		32c. "

No Copper in Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

TINNING.

14x48, by the case	8c.	₩ sheet
14x48, less than case	10c.	"
Boiler Sizes, 7 and 8 inch	12c.	"
" 9 inch	15c.	"
Other sizes not larger than 30x60	2½c.	₩ sq.
Larger than 30x60	5c.	"
Copper Bottoms, 34 @ 36c.	₩ lb	Net

O'NEILL'S PATENT PLANISHED COPPER.
14x48.

14 and 16 oz. and heavier.....39c. By the case, 38c. ₩ lb
12 oz. and lighter.....42c. " " 41c. "

Boiler Sizes.

7 in., 14x22. 8 in., 14x36. 9 in., 14xf0
14 and 16 oz. and heavier.....41c. By the case, 40c. ₩ lb
(And all sizes not over 20 inches wide.)
20x60
14 and 16 oz. and heavier.....42c. ₩ lb
12 oz.....45c. "

LEAD—DUTY: Pig, $2 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2½ cents per lb. All subject to a reduction of 10 per cent.

Spanish	6¼ @ 6¼c	gold
German Refined	6¾ @ 6¾c	gold
English	@ 7¼c	gold
Bar	dis 10 %	8¾c.
Pipe	dis 10 %	9c.
Tin Lined Pipe	dis 10 %	16½c.
Sheet	dis 10 %	9c.
Shot	dis 10 % Drop, 9c.; Buck, 9½c.	

Solder No. 1, 18c. @ 19c. No. 2, 17c. @ 17½c.

STEEL—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb.; over 11, 3¾ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. All subject to a reduction of 10 per cent. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as Steel.

American Cast Steel.

Tool	16c
Spring	12½c
Homogeneous	12½c
Tire	12½ @ 13½c
Machinery (round and square)	11½ @ 12c
File	12½c
Sheet	14 @ 16c
Saw Plate, mill and mulay	14 @ 16½c
Saw Plate, gang and X cut	13 @ 14c
" circular as to size	18 @ 30c

Chrome Steel.

Tool	₩ lb	20 @ 21c
Tool, extra fine	"	40 @ 75c
Spring	₩ lb	12c and upward
Machinery	₩ lb	14c.
Hammer	"	15c.
Gun or Homogeneous	"	16c

English Steel,—payable in gold, dis 5 % cash.

" Best Cast	₩ lb	18c
" Extra Cast	"	19c
" Round Machinery, Cast	"	11½c
" Swaged, Cast	"	18c
" Best Double Shear	"	18c
" Blister, 1st quality	"	13½c
" " 2d quality	"	11½c
" " 3d quality	"	10½c
German Steel, Best	"	11½c
do 2d quality	"	10½c
Sheet Cast Steel, 1st quality	"	18c
" " 2d quality	"	16c
" " 3d quality	"	14c
File Steel, Flat and ½ Round	"	12½c
" Square and Round	"	13c
" Mill	"	13½c
" Taper to 4 inch	"	17c
" Taper 3 and 3¼ inch	"	18c

SPELTER—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.—less 10 per cent.

Silesian, cash	7¼ @ 7¾c	gold
American "	8 @ 11c.	currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 15 per cent. ad val.; Electro-galvanized Plates, 2 cents per lb; Manufactures of, not enumerated, 35 per cent. ad val.—all subject to a reduction of 10 per cent. Bars, Blocks and Pigs, free. Banca, subject to duty of 10 per cent.

Banca	₩ lb	30c. gold
Straits	₩ lb	21c gold
English	₩ lb	24½c. gold

CHARCOAL TIN PLATE.

I C 10x14, Prime Charcoal		12·50
12x12, "		15·00
14x20, "		13·25
I X 10x14, "		14·75
12x12, "		15·25
14x20, "		15·75
D C 12½x17 "		12·00
D X 12½x17 "		14·25
For each additional X add		2·25

COKE TIN PLATE.

	Best.	2d Quality.	Ordinary.
I C 10x14	$12·00	11·00	10·00 @ 10·50
I C 12x17	12·50	11·75	
I C 14x20	12·75	11·75	

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$11·50	10·50 @ 11·25	8·00 @ 10·50
I X 14x20	13·75		
I C 20x28	21·00	21·50 @ 23·50	19·00 @ 21·50
I X 20x28	23·50	27·50	
I C 28x20 ft.	25·00		

ZINC—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet, 2½c. ₩ lb. All subject to a reduction of 10 per cent.

Sheet	cask	9¾c
"	open	10c

Paper Stock, Old Metals, &c.

(Dealers' Selling Prices.)

Canvas linen	6	@
" cotton. No. 1		@ 6
" No. 2		@ 3½
White linen rags, No. 1		@ 7¾
" " No. 2		@ 5¾
Colored	2½	@
Mixed woolens		@ 3
Soft woolens		@ 6¾
Gunny bagging	1¾	@ 2
Jute Butts	2¾	@ 2¾
Kentucky bagging	5¼	@ 5¾
Book stock	4	@ 4¾
Waste paper and scraps	1½	@ 3
Rope cuttings	1½	@ 3
Kentucky Bale rope	4	@ 4½
Oakum junk, No. 1	5½	@ 5¾
" No. 2	3½	@ 4
Grass rope	3¾	@ 4
Tarred Shaking	1¾	@ 1⅞
White Collar Cuttings, all paper	7	@ ..
" " muslin lined	5	@ ..
" Envelope "	7	@ ..
Hard White Shavings, No. 1	6½	@ ..
Soft " " No. 1	6	@ ..
White Shavings, No. 2	5½	@ 6
Mixed Shavings, part white	4	@ 4¾
Imperfections, No. 2, best folded sheets	5	@ ..
" " 1, Heavy Stock	4¾	@ 5
Book Stock, Mixed	3½	@ 4
" " No. 2, light	2¾	@ 3
Prints	1½	@ 2
Pure Manilas	2½	@ 2¾
Bogus Manilas and Hardwares	1¾	@ 1⅞
Commons	1	@ ..
Binders' Board Cuttings	1¾	@ 2
Straw Board Cuttings	1¼	@ 1¾

Old Metal.

Copper	22	@ 23
Yellow metal	16	@ 17
Brass	16	@ 17
Heavy Composition	19	@ 20
Old lead, solid		6¼
Tea lead		5¾
Wrought iron	1¼	@ 1⅜
Sheet iron	0¾	@
Cast iron	1	@ 1¼
Machinery iron	1¼	@ 1½
Zinc		5½
Pewter, No. 1	23	@ 24
" No. 2	10	@ 12
Spelter		7

Paints, Oils, etc.

Paints.

Black, lamp—Coach Painters	₩ lb	20c
" " Ordinary		6c
" Ivory Drop, fair		15c
" " best		35c
Black Paint, in oil	kegs, 8c.; asst'd cans, 11 c	
Blue, Prussian, fair to best		50 @ 75c
" " " in oil		25 @ 65c
" Chinese, dry		33c
" Ultramarine		25 @ 30c
Brown, Spanish		11½c
" Van Dyke		9c
Carmine, 40		$12 00
Green, Chrome		15 @ 23c
" in oil		18 @ 25c
" Paris	good, 30c; best, 40c	
" " in oil	30c; " 45c	
Mineral Paints		1¼ @ 4c
Orange Mineral		14½c
Red Lead, American		9¼c
" " English		10½c
" Venetian (N. C.) dry		2¾c
" " in oil	asst'd cans, 11c; kegs, 8½c	
" Indian, dry		10c
Rose Pink		13c
Sienna, American, Raw		4c
" Burnt		4½c
" " in oil		16 @ 26c
" Raw "		15 @ 25c
Umber, Burnt		4 @ 8c
" " in oil		16 @ 21c
" Raw		3½ @ 7½c
" " in oil		16 @ 22c
Vermillion, Chinese		$1 62
" English		1 75
" Trieste		1 52
" American, Common		23c
White Lead, American, pure dry		10½c
" " in oil		11½c
White, Paris, English, prime	in bbls. 2½ @ 2¾c	
Yellow Ochre French	2½ @ 2¾c	
" in oil	asst'd cans, 11c; kegs, 8½c	
" Vermont	in casks 1¾c	
Chrome	17 @ 21c	
" in oil	18 @ 28c	
Zinc White, American No. 1 dry		9c
" " 1, in oil		11c
" French (Paris)		11 c
" " in oil		12 c

Oils.

Linseed Raw	₩ gal. casks, 97c. bbls, 98c.	
" Boiled	" $1·02 " $1·05	
Whale, Crude		
" Bleached Winter		
Sperm, Crude		1·50
" Winter unbleached		1.70
" " Bleached		1·75
Seal, Extra Refined		
Lard, Pure Winter		82c
" Spring		
Cotton Seed, Crude		42½c
" Southern Yellow	46½c @ 47½c	
" White		
Neatsfoot, Winter	70c @ $1·10	
Natural Lubricating	38c @ 40c	

Sundries.

Asphaltum		9c
Benzine	₩ gal.	18c
Chalk		1½c
" Block		
Dryer, Patent, Am'n	asst'd cans, 10½c.; kegs, 9c	
" " English	" 11c.; " 9c	
Flocks		
Frostings		50c
Glue, White	38 @ 47c	
" Sheet		30c
Glaziers' Points, Zinc		9c
Gum, Copal		38c
" Damar		25c
" Shellac, English		60c
" " dark		50c
Litmarge		10c
Pumice Stone, selected Lumps		4 @ 6c
" powdered		4c
Putty in bladders		3½c
" in bulk		2c
Rotton Stone, soft, English		8c
Spirits Turpentine		49
Whiting, Spanish		1c

Glass.

French Window—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

SINGLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$8·00	$7·00	$6·75	$6·00
8 x 10 to 10 x 14	8·50	8·00	7·25	6·50
10 x 15 to 12 x 16	9·00	8·50	8·00	6·75
13 x 16 to 16 x 20	9·50	9·00	8·50	7·75
15 x 22 to 15 x 30	11·75	10·50	10·00	8·00
16 x 30 to 22 x 30	14·25	12·25	11·00	9·50
15 x 38 to 22 x 36	15·00	13·50	12·00	
24 x 36 to 24 x 40	15·75	14·25	12·50	
28 x 38 to 28 x 42	16·25	14·75	13·25	
28 x 44 to 28 x 50	17·25	15·75	14·25	
30 x 50 to 30 x 54	20·50	17·00	15·50	
32 x 54 to 34 x 56	21·50	19·25	17·50	
34 x 58 to 34 x 60	23·00	21·50	20·25	
36 x 60 to 40 x 60	26·50	24·25	23·00	

DOUBLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$13·00	$12·00	$11·50	$10·00
8 x 10 to 10 x 14	14·00	12·75	12·00	10·75
10 x 15 to 12 x 16	15·00	14·00	13·25	11·25
13 x 16 to 16 x 20	16·00	15·00	14·00	12·50
15 x 22 to 15 x 30	20·00	17·50	16·50	13·25
16 x 30 to 22 x 30	22·00	19·25	17·75	15·00
15 x 38 to 22 x 36	23·75	20·50	19·25	
24 x 36 to 24 x 40	24·75	22·50	20·00	
28 x 38 to 28 x 42	26·00	23·50	21·00	
28 x 44 to 28 x 50	27·50	25·50	22·50	
30 x 50 to 30 x 54	31·00	26·50	24·00	
32 x 54 to 34 x 56	32·50	29·00	26·50	
34 x 58 to 34 x 60	34·50	32·00	31·00	
36 x 60 to 40 x 60	39·50	36·50	35·00	

Sizes above—$12·00 per box extra for every 5 inches.
Discount to the trade, 50&10 to 50, 10&5 per cent.
An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 84 united inches, will be charged in the 84 united inches bracket.

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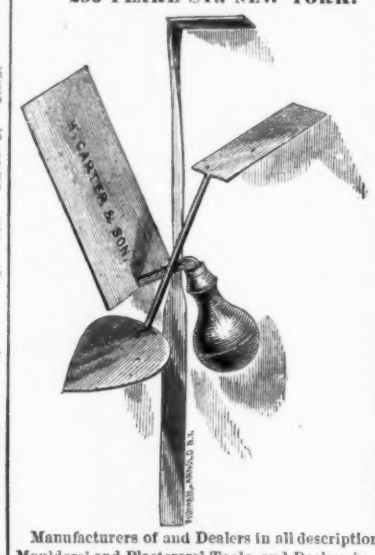

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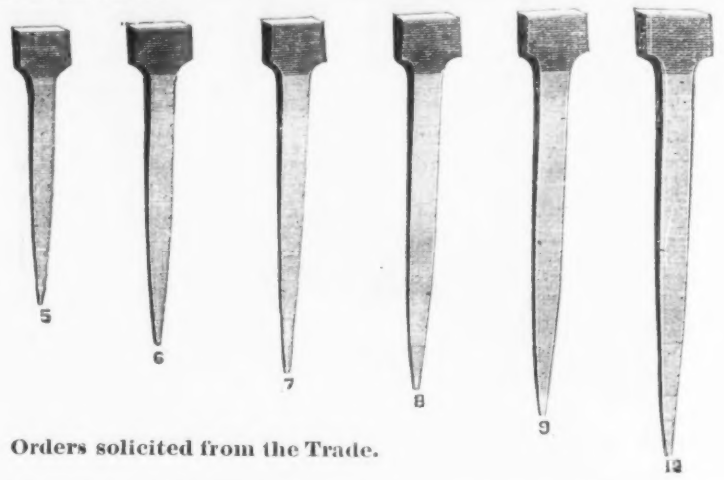

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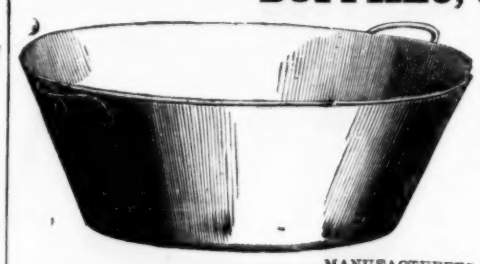

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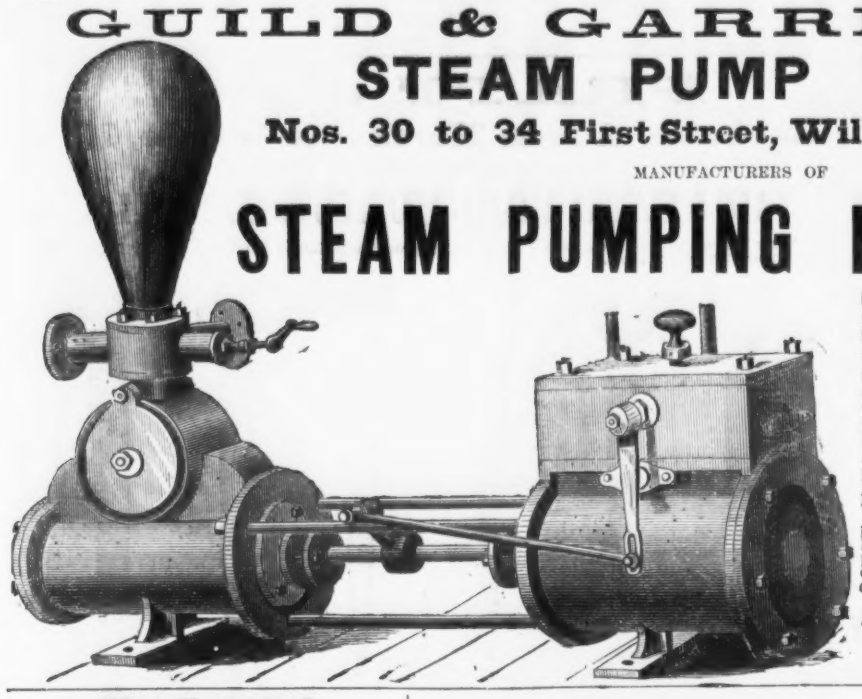

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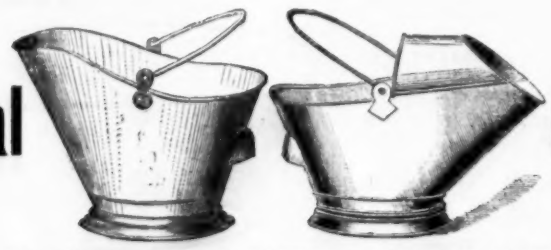
Coal  Hods.

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MANUFACTURERS OF
White Lead, Red Lead, Litharge Orange Mineral.

JOHN JEWETT & SONS
Manufacturers of the well known Brand of
WHITE LEAD.

JEWETT & SONS' PERFECTLY PURE WHITE LEAD.

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Also Manufacturers of
LINSEED OIL
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SHOVELS,
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Northampton, Mass.
Send for Circular and Price List.

Hardware.

ESTABLISHED 1836.

ALFRED FIELD & CO.,

Foreign Hardware Commission Merchants

IMPORTERS AND EXPORTERS.

Offices and Warehouses:

Birmingham, Sheffield and Liverpool, England; New York, Philadelphia, Cincinnati and New Orleans, U. S.; Montreal, Canada.

In addition to our **Commission business,** and to meet the wants of the **Wholesale Trade only,** we are carrying in stock at **47 John and 5 Dutch Sts., N. Y., and 75 Gravier St., New Orleans,** leading goods in our line, such as,

Anvils, Chains, Vises, John Wilson's Goods, Chesterman's and other **Tapes, Brades London Trowels, Grass Hooks, Guns,** Padlocks, Curry Combs, **Pocket and Table Cutlery, Screws,** Galvanized Twisted Clothes Lines, Elcy's Caps, Wads and Cartridge Cases **and a large line of Miscellaneous Goods.**

We are Sole Agents for Lawrence's new Patent Curry Combs, to which we call attention of the trade.

HILGER & SONS,

87 Chambers and 69 Reade Streets, NEW YORK.

MANUFACTURERS AND IMPORTERS OF

German Hardware, Cutlery, Scissors, Coffin Lace, Sheep Shears, Ball Braces, Bright Halter and Coil Chains, &c.

Also, Birmingham and Sheffield Hardware and Chains, Butcher's Files, Edge Tools & Razors, Wostenholm's Razors & Farriers' Knives, John Wilson's Butche Knives and Steels, Stub's Tapers, Chesterman's Metallic Tapes, Isaac Greave's Hedge Shears, James Bees & Parkin's Spoke Shaves, Turn Screws and Braces, Pad Locks, Goulcher's Gun Locks, Brades Trowels, &c.

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Manufacturers and Importers of **Cutlery, Guns, Hardware** and **Railroad Material.**
Proprietors of **TRENTON VISE AND TOOL WORKS, Trenton, N. J.**—Vises, Picks, Mattocks, Grub Hoes, Sledges, Hammers, Bridge Work, Turn Tables, etc.
Proprietors of the **MANHATTAN CUTLERY CO.,** "O. K." Razors.
Sole Agents for **LAMSON & GOODNOW MFG. CO., Shelburne Falls, Mass.**—Table Cutlery and Butcher Knives.
W. & S. Butcher's Files, Edge Tools and Razors, the largest stock in the United States.
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We always have on hand a full assortment of

German and English Hardware, Cutlery, Guns, Gun Material, Chains, Heavy Goods.

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Sheffield, England,

MANUFACTURERS OF

Saws, Files, Edge Tools and Steel.

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ROY & COMPANY,

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Manufacturers of

Wrought Iron Butts, Strap and T Hinges,

PLATE AND HOOK HINGES,

Cold Pressed Nuts and Washers, Felloe Clips, &c

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MANUFACTURERS OF

Wrought Butts, Strap and T Hinges.
Bronzed Butts and Bolts.
Wrought Barrel, Square and Shutter Bolts.
Wrought Chest Handles, Washers, Flush Bolts, &c.

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Factory at New Britain, CONNECTICUT.

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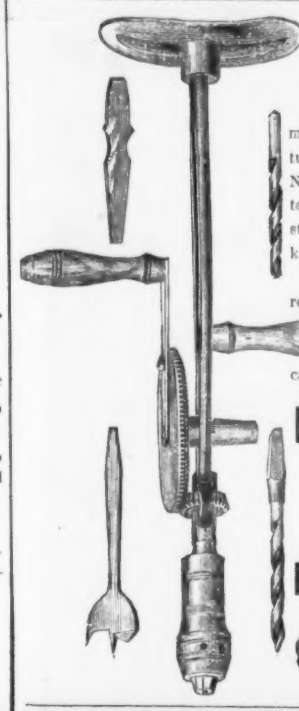
MANUFACTURERS OF

WROUGHT IRON BUTTS,

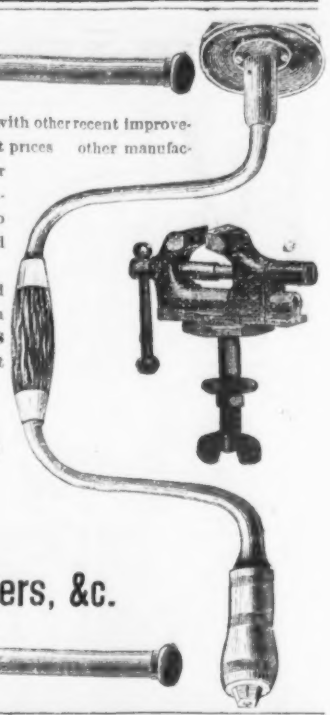
All our goods are manufactured from patent faced iron plates; they have a smooth face and bright finish.

163 & 165 Mulberry Street. New York.



The jaws of **BARBER BRACES** are now made of Cast Steel. This, with other recent improvements, makes them by far the best Brace in market. We are willing to meet prices other manufacturers when their goods are made equal to ours. If cheap goods are wanted, our No. 22 and 23 Braces will meet that demand, as we will guarantee them to be better than any other Brace in use, except our first quality. We have made two styles of **Ratchet Braces,** which have been largely sold, and now have a third kind nearly ready which we think is better than either of the others.

Our **BREAST DRILLS** have a chuck with Steel Jaws, which will hold round twist drills up to half inch, and will also hold equally well, auger bits with shanks of any shape. The demand for these **BREAST DRILLS** has been so large, that we have not been able to accumulate a stock, but can put in a few with each brace order if wanted.



MILLERS FALLS CO.,

78 Beekman Street, New York.

ALSO MANUFACTURE

Parallel Vises, Glass Cutters, Iron Cutters, &c.

HOWARD PARALLEL BENCH VISE.

MANUFACTURED BY

Howard Iron Works,

Send for price list. Buffalo, N.Y.

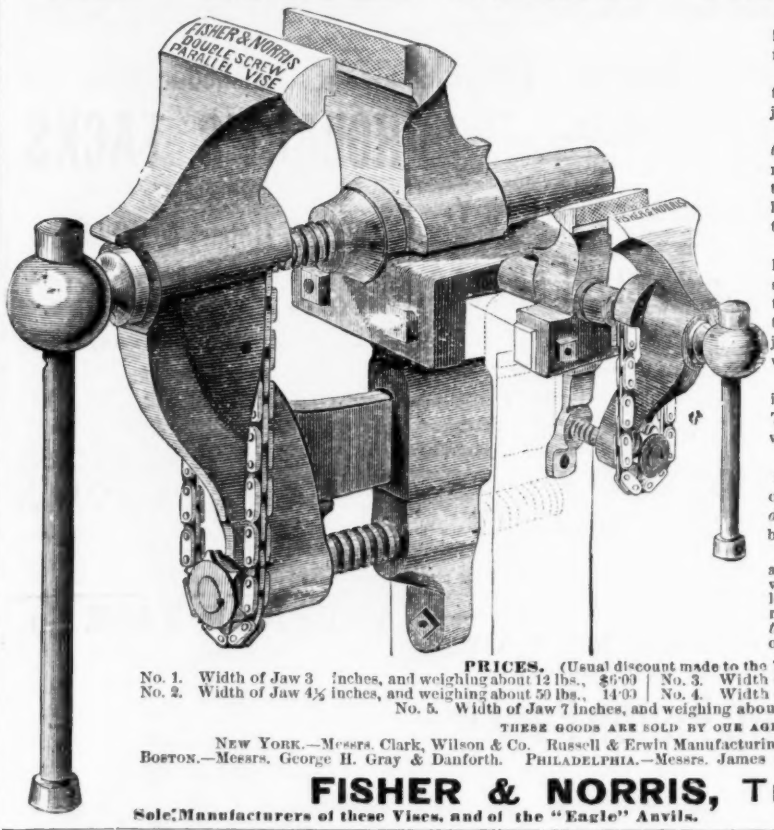
RUSSELL & ERWIN MFG. CO., New York and Philadelphia, Agents.

NOTICE.

These **Vises** are only manufactured at the **HOWARD IRON WORKS,** at **Buffalo, N. Y.** and are so stamped. The improvements in these **Vises** which are patented are valuable, and parties who claim to manufacture, and are offering a **Vise** representing it to be the same as the **HOWARD VISE,** are deceiving the Trade.

HOWARD IRON WORKS.

THE DOUBLE SCREW PARALLEL VISE.



More than twenty-five years' use of this Vise by Machinists, Tool Makers, Locomotive Shops, etc., has established its superiority over every other.

It is the only one which has all the strength and "grip" of the ordinary English Vise; and at the same time with the jaws *parallel* at every point of opening.

In all other "Parallel" Vises using only one screw, *less than one-third* of the power applied is effective on the work itself; beside, in those vises the large waste of power on the slide from *friction* and the *tendency to "jam,"* of the lower end of the jaw, if screwed up very hard, renders them unfit for heavy work.

In this vise the jaws are kept *always parallel* by the lower screw moving in or out exactly with the upper, lever screw, by means of the chain connecting both: also, by their relative position *two-thirds* of the power applied at the lever screw is received by any piece held between the jaws—thus enabling the heaviest work ever required of a vise to be done with this.

The Screws are forged of the best refined iron, and work in *solid cut thread* boxes. The Jaws are faced with *best* Tool Steel, welded on, file cut, and properly tempered for wear.

The Chain is very carefully made of case hardened inside links and rivets, and, acting only to *regulate* the position of the lower screw for different points of opening, has *no direct strain* of the work upon it; it is therefore as durable as the other parts.

Only the strongest material is used in this manufacture and from actual experiment on the six inch jaw vise which has screws of 1⅝ inch diameter and lever 19 inches long, it has been found that applied at the lever screw, it required to break either of the jaws, *eleven and one-half tons,* thus exhibiting a maximum strength far above *any* other vise of like size.

PRICES. (Usual discount made to the Trade.)

No. 1. Width of Jaw 3 inches, and weighing about 12 lbs., $6·00 | No. 3. Width of Jaw 5 inches, and weighing about 80 lbs., 18·00
No. 2. Width of Jaw 4½ inches, and weighing about 50 lbs., 14·00 | No. 4. Width of Jaw 6 inches, and weighing about 125 lbs., 24·00
No. 5. Width of Jaw 7 inches, and weighing about 160 lbs., $30 00.

THESE GOODS ARE SOLD BY OUR AGENTS IN

New York.—Messrs. Clark, Wilson & Co. Russell & Erwin Manufacturing Company. Horace Durrie & Co.
Boston.—Messrs. George H. Gray & Danforth. Philadelphia.—Messrs. James C. Hand & Co. Baltimore.—Mr. W. H Cole.

FISHER & NORRIS, Trenton, N. J.,

Sole Manufacturers of these Vises, and of the "Eagle" Anvils.

E. C. C. KELLOGG
PATENT.
Feb. 13, 1866.

COMBINATION BELT PUNCH,

Pronounced by those who have used them the handiest and most desirable tool in use of its kind. As will be seen, the combination consists

☞ **BELT PUNCH, KNIFE AND AWL,**

Also, ☞ *Needle for Lacing Rubber Belting,* so combined that each tool does its specific work and not interfere with either o the others.

E. C. C. KELLOGG & CO., Hartford, Conn.

For Sale Wholesale and Retail by **ÆTNA NUT COMPANY, 97 Chambers Street, New York.**

RIEHLE BROTHERS,
Ninth Street, near Coates, **Philadelphia.**
New York Store, 93 Liberty Street,
Pittsburgh Store, 56 Wood Street,

"Patented Furnace Charging Scale."

Double Beam R. R. Track Scale, Compound Parallel Crane Beams, &c. Patented First Power Lever Wagon Scales. Testing Machines any capacity.

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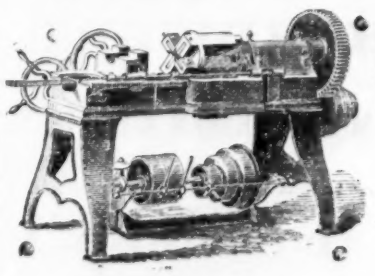

Manufacturers of the

Adjustable Steel DRILL CHUCK,

Interchangeable Bolt & Nut Threading Machine, Nut Tapping Machines,

And all other kinds of Bolt and Nut Machinery.

New Haven, Conn.

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GROCERS BUY THE AMERICAN COFFEE & SPICE MILLS
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MOLASSES GATES
BUNGHOLE BORERS
CHEESE KNIVES
TOBACCO CUTTERS
ETC. ETC. MADE BY THE ENTERPRISE MNFG. Co PHILAD'A, PA
SOLD BY ENTERPRISE MANFG. CO. PHILADA
FAIRBANK'S
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FOR THE SALE OF

CHESAPEAKE CUT NAILS AND SPIKES.

MALLORY, WHEELER & CO.'S LOCKS, KNOBS, &c.

American Screw Co.'s Screws.

AMERICAN BUTT CO.'S Cast Butt Hinges.

PLYMOUTH TACK CO.'S Tacks and Rivets.

ROBERT MANNS' Axes.

WOOLWORTH'S Axe Handles.

BEST NORWAY NAIL RODS, Newton Brands.

M. Rowland & Co.'s Shovels and Spades.

ALSO, HEADQUARTERS FOR

O. AMES & SON'S SHOVELS AND SPADES.

HENRY DISSTON'S SAWS, HAND, CROSS-CUT, MILL, &c.

SHEBLE & FISHER'S Forks.

HARPER'S Hoes and Rakes.

MOSS & GAMBLE'S Files.

The trade can save both time and freight by ordering from our stock containing a large and full assortment of the above goods, which we offer at **Manufacturers' Prices.** Send for Price List.

KEITH & KELSO,

Hardware Commission Merchants,

Nos. 23 and 25 South Charles St., BALTIMORE, MD.

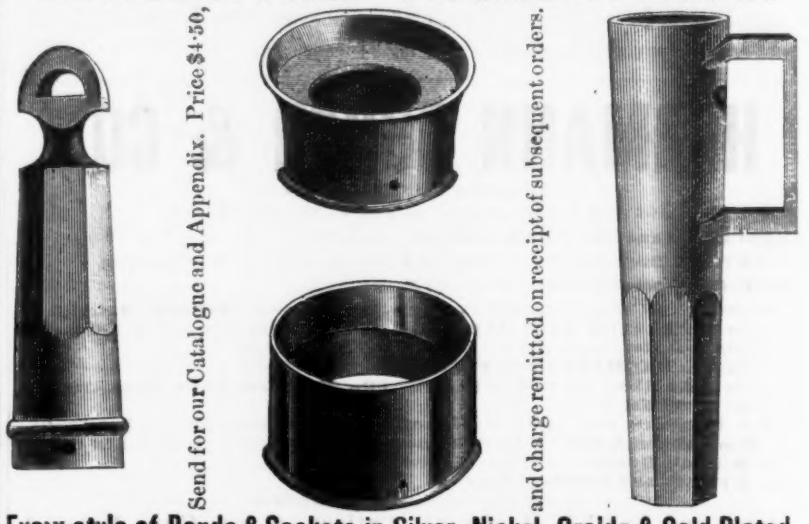
The Hart, Bliven & Mead Mfg. Co.

18 & 20 Cliff Street, and 243 & 245 Pearl Street, New York.

Factories at KENSINGTON, CONN.

MANUFACTURERS OF

CARRIAGE HARDWARE.



Send for our Catalogue and Appendix. Price $4·50, and charge remitted on receipt of subsequent orders.

Every style of Bands & Sockets in Silver, Nickel, Oroide & Gold Plated.

BAEDER, ADAMSON & CO.,

Manufacturers of

Sand and Emery Paper and Emery Cloth

(Also, in Rolls for machine work.)

GROUND EMERY, CORUNDUM AND FLINT,

Glue & Curled Hair, Cow Hide Whips.

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NEW YORK, 67 Beekman St., | CINCINNATI, 92 Main St.,
CHICAGO, 182 Lake St.

COBB & DREW,

Plymouth, Mass.

Manufacturers of Copper, Brass, and Iron Rivets; Common and Swedes Iron, Leathered, Carpet, Lace and Glaze Tacks; Finishing, Hungarian, Trunk Clout and Cigar Box Nails, &c. Rivets made to Order.

NEW YORK AGENCY

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HARDWARE.

165 Greenwich Street.

Agent for the Philadelphia Star Carriage and Tire Bolts

SAMUEL LORING'S

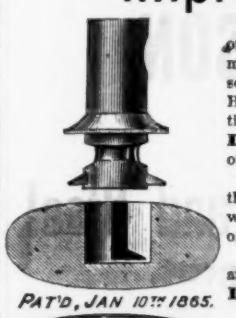
PLYMOUTH TACK AND RIVET WORKS

PLYMOUTH, MASS., manufacturer of

TACKS, BRADS, NAILS AND RIVETS.

Swedes and Common Iron Tacks; Leathered, Carpet Brush, Lace and Gimp Tacks; Finishing, Hungarian, 2d 2d and 3d Fine, Trunk, Clout, and Cigar Box Nails; Black and Tinned Trunk Nails; Zinc, Iron, Copper and Steel Shoe Nails; Brads and Patent Brads; Glaziers' Points &c., &c., &c., **COPPER, BRASS AND IRON RIVETS**, of all kinds. Coopers' Rivets, from 1d to 6d, in casks of 100 lbs. each. Hose, Belt and Shoe Rivets and Burs. Oval and Countersunk Heads of extra lengths, made to order. SHIP AND BOILER RIVETS OF ALL SIZES AND LENGTHS

Improved Door Knobs.



On the 10th January, 1865, we obtained Letters Patent for improved method of securing necks to Mineral and Porcelain Door Knobs, which improvement was used by us long enough to prove its utility, but on account of unsettled claim of joint ownership by former partner, its use was discontinued. Having now made a further improvement, for which we have made application for a Patent, we are now making the **BEST SECURED** and **MOST DURABLE** Mineral and Porcelain Door Knobs ever offered in this or other markets.

We solicit orders for these Knobs at our regular prices for old styles, with the understanding that if any can be loosened from or gotten off the necks without breaking the tops, they may be held by the purchaser subject to our order, with expenses added.

See *The Iron Age*, of August 21st., page 11, for reduced list prices on Locks and Latches; also, for illustrated description of our patent **Telescope Locks and Latches**, with patent Flat **Steel Perforated Keys.**

Address

BRANFORD LOCK WORKS,

Branford. Conn.

Or, THE HART, BLIVEN & MEAD MANUFACTURING CO., Agents,

18 & 20 Cliff and 243 & 245 Pearl Streets, New York

Headquarters for

Henry Disston & Sons' Saws,

Hand, Mill, Circular and Cross Cut.

ALSO,

Plumbs and Levels, Try Squares, Gauges, Trowels and Barker's Reversible Butt.

A full assortment constantly on hand. Address orders to

GRAHAM & HAINES, 88 Chambers Street, N. Y.

Excelsior Manufacturing Company's CLUB SKATES,

GRAHAM & HAINES, Sole Agents,

88 Chambers Street, New York.

These Skates are made of Cast Steel, and very much improved over past season. Our No. 20 and 25 are now superior to anything in the market, and the low price at which we offer them make them very desirable for both retailer and jobber.

Per Pair	$3 25	$3 50	$4 00	$5 00	Discount 35 per cent.
Number	50	40	25	20	

Established in 1810.

HOBART'S TACKS.

Manufactured by

Dunbar, Hobart & Whidden,

Office and Salesroom,

116 Chambers Street, N. Y.

Factory, SOUTH ABINGTON, MASS.

Manufacturers of

American, Swedes and Copper Tacks, Tinned Leathered and Large Head Tacks, Finishing Nails, Black and Tinned Trunk Nails, Miners', Gimp, Lace and Brush Tacks, Hungarian, Chair, Cigar Box and Barrel Nails, Glaziers' Points, Iron, Steel, Copper, Zinc and Brass Shoe Nails, **HEEL and TOE PLATES, STEEL SHANKS, and FANCY HEAD NAILS, SILVER or JAPANNED LINING and SADDLE NAILS.**

A full assortment always on hand at salesrooms, for immediate delivery if required.

Odd and irregular sizes made to order or cut from sample at short notice. Send for Price List.

AMERICAN TACK Co

MANUFACTURERS OF

Copper, Swedes, and Iron Tacks,

BRUSH, LACE AND GIMP TACKS,

Leathered, Tinned, and Iron Carpet Tacks; Finishing, Black, and Tinned Trunk Nails

Hungarian and Cigar Box Nails;

COPPER and IRON BOAT NAILS

ZINC, COPPER, STEEL, and IRON SHOE NAILS

2d and 3d FINE NAILS;

Bright and Tinned Roofing Nails,

BRADS, PATENT BRADS, &c,

Factory, Fairhaven, Mass.

Salesroom, 117 Chambers Street, NEW YORK

N. B.—Any variation from the regular size or shape of the above named goods cut from sample to order.

The Challenge Door Spring Co.,

"Easily Applied and not Liable to get out of Order."—From Report of Judges at American Institute Fair, 1872.

Exclusive Manufacturers of the

[March , 1873

In Appearance the Most Beautiful. In Action the Most Graceful. In Use the Most Reliable.

The Challenge Springs are manufactured from **Steel Wire, tempered by an Improved Process,** the result of repeated experiments, and must not be classed by dealers with the numerous worthless "Coil Springs" made from common Bed Spring Wire.

No. 49 Ann Street, NEW YORK.

CENTENNIAL

SELF-LUBRICATIVE

Hemp Piston Packing

FOR

Locomotives, Steamships, Stationary Engines, Hot or Cold Water Pumps.

Recommended by Master Mechanics and Engineers, as the cheapest and best in market. **No more Extortionate Prices. No more Fluted Rods**—but a good article at a fair price.

JOHN CANFIELD & CO.,

SOLE MANUFACTURERS,

Office, 1321 Fairmount Ave., Phila.

PATENT APPLIED FOR. Send for Circular.

GEO. M. EDDY & CO.,

Manufacturers of **Measuring Tapes.**

853 Classon Avenue, Brooklyn, N. Y.

Manufacturers of Paine's Patent Steel Standard Measuring Tapes, for Surveyors, Engineers and Mechanics requiring a correct measure of great length according to U. S. Standard. Also of Tape measures for the same trades, Lumbermen, Machinists, Tailors, Shoemakers, Dressmakers, &c. Catalogues on application.

AMERICAN BUTT CO.,

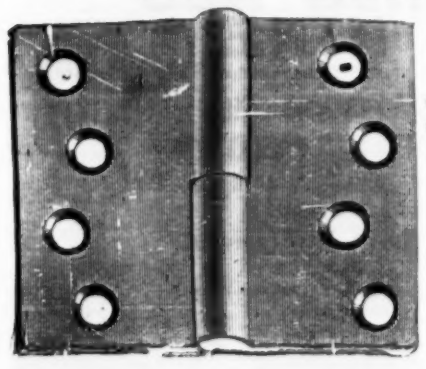
PROVIDENCE, R. I., Manufacturers of

Cast Butt Hinges

AND

BUILDERS'

HARDWARE.



New York Warehouse with

Messrs. GRAHAM & HAINES,

No. 88 Chambers Street.

Send for Price List.

The Wethersfield Novelty Co.

MANUFACTURERS OF

Builders' Hardware and Plated Goods.

BRASS AND IRON FOUNDERS.

PATENT DOOR-KNOB ROSETTE.

No. 1, Rosette.
No. 2, Screw entering No. 3.
No. 3, Stationary bushing remaining firmly in door.

Particular attention given to Light Manufacturing for outside parties; also,

BRASS & IRON FOUNDING, SILVER & NICKEL PLATING. Orders Solicited.

We would call the particular attention of the trade to our **PATENT IMPROVED ROSETTE** for Door Knobs. This Rosette does away with the small screws and *cannot* work loose. It can be applied four to one faster than any others. Can be applied to old doors.

Factory on the Valley R. R. at Wethersfield, Conn.

Communication from Hartford (2 miles) by horse or steam cars.

PHILADELPHIA.

(Corrected weekly by Lloyd, Supplee & Walton).

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.—Solid Cast Steel.....₱ ℔ 14c
Peter Wright's.....₱ ℔, gold, 12½c
Wilkinson's.....11½c
Eagle.....11 cents currency—dis 13 @ 15&5 %
Apple Parers.—Reading Improved.....per doz $8 50
Victor, Improved..... " 8 25
Union, " ..... " 6 00
Turn Table, " ..... " 8 50
Discount for 25 dozen lots..... " 50c
Axes.—Mann's Light.....Per doz. $13 00 @ 14 00
Hunt's Light..... " 14 00 @ 14 50
Red Indian, all sizes..... " 12 50 @ 12 00
Red Chieftain, all sizes..... " 12 50 @ 13 00
Crown Prince..... " 13 50 @ 13 00
Augers and Auger Bits.—Pierce's Pat. Twist Bits.....dis 25 %
Bates' & Ives' Bits.....dis 30&10 %
Douglass' Bits.....dis 30&10 %
Hamden Auger Bits.....dis 30&10 %
Cook's Bits.....dis 30 %
Bonney's Pat. Hollow Augers.....dis 25 %
Stearn's Patent Hollow Augers.....dis 25 %
Russell Jennings' Bits.....dis 10 %
Bates' & Ives Nut Augers.....dis 30&10 %
Douglass Nut Augers.....dis 30&10 %
Watrous' Ship Augers.....dis 10 %
Balances.—Landers Frary & Clark's.....dis 15 %
Chatillon's.....dis 15 %
Morton's.....dis 15 %
Common Spring, with Hook.....₱ doz $1 38 @ 2 00
Bells.—Bevin Bros. Mfg Co. Full Weight Hand Bells.....dis 50&10 @ 60 %
Bevin Bros. Mfg. Co., Extra Light Hand Bells.....dis 60 @ 60&10 %
Other makers light.....dis 60&10 %
Connell's Door Bells.....dis 50 %
Great Western and Kentucky, Cow.....dis 5&10 %
Boring Machines.—Bates' Mfg. Co., complete with augers.....dis 15 @ 20 %
Douglass' Mfg. Co., complete with augers..dis 15 @ 20 %
Common Boring Machines, no Augers.....$4 25 @ 4 00
Auguar, " " ..... 5 25 @ 8 00
Bolts.—Eastern Carriage Bolts.....dis 70&10 %
Western " " .....dis 70&10 %
Philadelphia " " .....dis 50&10 %
Wrought Snutter Bolts.....dis 45 @ 50 %
Cast " " .....dis 30&10 %
Skelly's Phila. Norway iron, finish. points....dis 50&5 %
Braces.—Barber s.....dis 40 %
Backus.....dis 40&10 %
Bartholomew's American Ball.....dis 10&10 %
Spofford.....dis 40 %
Butts.—Cast Fast Joint, Narrow.....dis 40 %
" " Broad.....dis 40 %
Cast Loose Joint.....dis 50 %
" Acorn, Loose Pin.....dis 40&10 %
Wrought Loose Pin.....dis 35 %
" Table Hinges and Back Flaps.....dis 30 %
" Narrow.....dis 30 %
" Loose Joint.....dis 35 %
" Reversible.....dis 35 %
Parker's Bling Butts, Shepard's " " , Clark's " " , Garretson's " " } dis by the case 50 %
Lull & Porter's " .....dis 25&10 %
Cherritree Blind Butts for wood.....dis 50 %
Chains.—German Halter.....new gold list dis 10 %
" Coil.....new gold list dis 10 %
Galvanized Pump.....₱ ℔ 13c
Best Proof Coil Chain—

₱ ℔.....	13¾	10¼	10	9¼	9¼	9	8½c gold
	3-16	¼	5-16	⅜	7-16	½	⅝ in.

By the cask, 560 lbs., discount ½c per lb. Common Chain, ¼c per lb. less than proof.
Chisels.—Socket Framing.....dis 60 @ 60&10 %
Socket Firmer.....dis 60 @ 60&10 %
Tang " .....dis 40 @ 40&10 %
Beatty's Framing and Firmer.....dis 10 @ 15 %
Casters.—Porcelain Wheel.....dis 25&10 %
Iron.....dis 25&10 %
Brass.....dis 25&10 %
Clothes Wringers.—Universal.....per doz $72 00
Novelty..... " 72 00
Reliance..... " 72 00
Providence..... " 72 00
Orders for 5 dozen, discount $3 per dozen.
King Wringers (Iron Frame).....per doz $68 00
Coffee Mills.—Common Box and Side.....dis 10 @ 15 %
Patent Box and Side.....dis 10 @ 15 %
Cutlery.—American Pocket (best).....dis 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices.
Drawing Knives.—Hart Mfg. Co.'s ..dis 60 @ 60&10 %
Concave Adjustable Handle.....dis 10 %
Beatty.....dis 10 @ 15 %
Fry Pans.
Tinned.....dis 20 %

₱ doz..	$3 00	3 25	3 62	4 00	4 30	5 00	5 50	6 00	7 00
No....	0	1	2	3	4	5	6	7	8

Burnished

₱ doz..	$2 80	3 00	3 38	3 75	4 12	4 50	5 00	5 62	6 75
No....	0	1	2	3	4	5	6	7	8

Files.
Nicholson Mill Files.... new list, $5 00 to £ cur dis 10 %
" Bastard..... " 5 00 to £ cur dis 10 %
" Taper..... " 5 00 to £ cur dis 10 %
Butcher's Mill.....$5 75 to £ gold
" Bastard..... 5 50 to £ gold
" Taper..... 5 50 to £ gold
Moss & Gamble—Mill, Taper and Bastard.....5 50 @ 5 25 to £ gold
Fluting Machines.
Royal, No. 1, 1½ inch Rollers.....list $6 00
" No. 2, 6 " " .....list 7 00
K. F. M.—4½ in. rolls..... 5 00
" —6 in. rolls..... 6 00
Hammers.
Yerkes & Plumb's.....dis 10 %
Hammond & Son's.....dis 5 %
Veree.....dis 5 %
Hatchets.
Beatty's.....dis 10 @ 15 %
Shingling and Half, ₱ doz...$7 00 7 50 7 75 8 00 / No..... 1 2 3
Yerkes & Plumb.....dis 10 %
Shingling and Half, ₱ doz...$7 00 7 50 8 00 8 50 / No..... 1 2 3 4
Claw, ₱ doz.....$7 50 8 00 / No..... 1 2 3
Hinges.—Strap and T, advanced Feb. 6.....dis 25&7½ %
Bonney's No. 1 Gate.....dis 25 %
" No. 2 and 3.....dis 35 %
Horse Nails.

	Nos.	6	7	8	9	10
Ausable		27	25	24	23	22
Globe		28	26	25	24	23
Brundage		26	24	23	22	21
	Nos.	5	6	7	8	9 10
Putnam		32	28	26	25	24 22

On Ausable, Globe and Brundage 1000 ℔ lots.....dis 5 %
Knobs.—Door, Mortise and Rim.
Makes in Combination.....dis 50 %
Extra discount for cash 2 %
Porcelain and Mineral.....dis 20 %
Locks and Latches.—Rim and Mortise.....dis 50 %
Extra discount for cash 2 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 50 %
Scandinavian Pad Locks.

₱ doz.....	$10 50	10 50	12 00	12 00	15 00	15 00
No.....	9	9¼	10	10¼	11	11¼
₱ doz.....	$13 00		16 00		22 00	22 00
No.....	12		12½		13	14¼

Trunk Locks.....dis 5 @ 10 %
Thumb and Rogeens Latches.....dis 25 %
Lanterns.—Square Candle and Oil.....dis 10 %
Globe for Oil.....dis 10 %
" " Kerosene.....dis 10 %
Tubular Lanterns.....dis 10 %
Mattocks.—Long and Short Cutter.....dis 25 %
Western Pattern.....dis 25 %
Pennsylvania Pattern.....dis 15 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 60 @ 60&10 %
Lincoln's " .....dis 40 @ 40&10 %
Landers, Frary & Clark's Petroleum...dis 10 @ 10&10 %
Taylor's Petroleum Faucets.....dis 20 @ 20&10 %
Brass Liquor Cocks.....dis 20&10 %
Meat Cutters.—Dixon's.....dis 10 %
Woodruff.....dis 10 %
Stowe.....dis 10 %
Hale's.....dis 25 %
Stuffers.....dis 10 %
Planes.—Auburn Tool Co.'s "Beach".....dis 30 %
Taber Plane Co., "Bench".....dis 30&10 %
Metallic Plane Co.....dis 25&5 %
Evans Pat. Circular.....net
Plane Irons.—American.....list net
Butcher's.....gold £, $5 50
Picks.—Philadelphia.....net
Pittsburgh.....net
Plumbs and Levels.
Stanley Rule and Level Co.....dis 60 @ 60&10 %
Wm. Johnson, (Stanley List).....dis 60 @ 60&10 %
Rakes.—Cast Steel Garden.....dis 33⅓ %
Malleable Garden.....dis 33⅓ %
Wood Head Iron Teeth.....dis 30 @ 40 %
Rules.—Stanley Rule and Level Co.....dis 60 @ 60&10 %
Steven's and Hubbard's.....dis 60 @ 60&10 %
Steelyards.—American Pattern.....dis 15 %

₱ doz.....	$5 50	7 00	9 00	1 00	11 00	12 00
No.....	50	100	150	200	250	300

English Pattern.....dis 15 %

₱ doz.....	$7 00	8 67	10 67	12 67	14 67	16 67
No.....	50	100	150	200	250	300

L. F. & C. Excelsior.....dis 10 %

₱ doz.....	$9 00	10 00	12 00	15 00	18 00	21 00
No.....	50	100	150	200	250	300

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....₱ doz. $11 00 net
Clipper No. 10, Boxed and Sharpened.....₱ doz $10 50
" " 5, " " " 10 00
Common Scythes.....₱ doz $7 00 @ 10 00
Squares.—Steel and Iron, new list.....dis 50 %
Saws.—Disston's Cross Cut.....dis 12½ %
Disston's Hand.....dis 12½ %
W. McNeice's Hand, Cross-Cut & Circ'r, new list..dis 15 %
Boynton's Lightning, new list.....dis 30 %
Shovels and Spades.
Rowland's Plain Back, list Feb. 1873.....dis 20&10 %
" Back Strap " .....dis 20&10 %
Oliver Ames & Sons.....new list dis 12½ %
Grady Shovel Co.....dis 12½&5 %
Sad Irons.—Richmond (pool-hed face).....per lb. 4½c.
Coquanock (polished face)..... " 4½c.
Stone.—Arkansas Oil, No. 1.....₱ ℔ $1 75
Turkey Oil, No. 1..... " 1 00
Washita Extra..... " 30c
" No. 1..... " 22c
" " 2..... " 15c
Hindostan Stone..... " 5½c
" Axe..... " 7c
Screws.—Iron.....new list, Jan. 1st, 1874, dis 33⅓ %
Brass.....new list, Jan. 1st, 1874, dis 33⅓ %
Spoons.—
Plated Spoons, Rogers Bros.'...new list dis 30 @ 30&5 %
Britannia Spoons.....dis 40 @ 40&5 %
German Silver.....new list dis 10 @ 15 %
" Light.....new list dis 15&5 %
Lalance & Grosjean Iron.....dis 10 %
Springs.—Gray's Door.....dis 40 %
Torry's Door.....dis 40 %
Stocks and Dies......dis 15 %
Stove Polish.—Gem.....₱ gross, $5 00
Onyx..... " $5 00
Try Squares.—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willis Thrall, No. 2.....dis 30&10 %
Disston's No. 2.....dis 40 %
Tacks, &c.—Half Weight Tacks.....dis 30 %
" " " by the case.....dis 70&7½ %
Clout and Finishing Nails.....7½ %
" " " by the case.....dis 7½ %
Traps.—Genuine Oneida—Newhouse list.....dis 20 %
Imitation " " .....dis 30 %
Vises.—Solid Box.....₱ ℔ net 15c
Wrenches.—Coes Genuine.....dis 40 %
Coes Imitation Wrought Bar.....dis 50 %
" " Malleable Bar.....dis 60 %
" " (Kellogg) Malleable Bar....dis 50 @ 10 %
Tafts Pattern (Wrought Bar).....65 %
" " Kellogg's (Nail Bar).....dis 60&10 %
Philadelphia Tool Co.'s Pat. Duplex.....dis 25 %
" " " Improved Baxter.....dis 25 %
" " " Adjustable Fork.....dis 25 %
Wire.—No. 0 to 18.....dis 35 @ 37½ %
No. 19 to 26.....dis 40 @ 42½ %
No. 27 to 36.....dis 45 @ 47½ %
Coppered 0 to 12.....dis 15 @ 20 %
Tinned Broom Wire.....dis 20 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.

Feb 13, 1874.

Augers—C. S. Cut, French, Swift & Co.....dis 30&10 %
Bits, Auger—Pierce s.....dis 30 %
Snell Mfg. Co.....dis 20 %
Jennings.....dis 10 %
Bells, Cow—Yaw's Genuine.....dis 25 %
Bolts—Carriage and Tire, Square Neck.....dis 70&10 %
Diamond Neck.....70&10&10 %
Braces—Bit, Spofford's Patent.....dis 40 %
Brads, Cut.....dis 50&7½ %
Boards—Stove, Brooks' Patent.....dis 30 %
Butts—Brass.....dis 25 %
Cast Loose Joint.....dis 50 %
" " Pin.....dis 15 %
" " " Japanned.....dis 45 %
" " " Silver Tipped.....dis 30 %
Wrought Narrow.....dis 30 %
" Broad, Loose Joint.....dis 35 %
" Table and Back Flaps.....dis 30 %
Wrought Butts, Loose Pin.....dis 35 %
Belting—Rubber.....dis 30 @ 30&5 %
Leather new list.....dis 30 @ 30&5 %
Beaters, Egg, "Peerless".....per doz $4 00
Brick—Bath (box of 2 doz) Best English.....$1 50
"Rutherford".....$1 25
Chalk—White, Carpenter's.....₱ gross, 50c
Red, Carpenter's..... " 75c
Blue, " ..... " 90c
Chisels—Firmer Socket.....dis 60&10 %
Framing Socket.....dis 60&10 %
Corner Socket Chisels.....dis 60&10 %
Slick's Carpenters'.....dis 60&10 %
Castings—Malleable.....dis 60&10 %
Cherry Seeders.....₱ ℔ 10½c
Elbows—Corrugated.....per doz $12 00

	5	5½	6	7
Charcoal	$4 25	5 25	5 25	6 50
Russia	10 00	13 00	13 00	14 00

dis 15 %

Files—Wheeler, Madden & Clemson's.....dis 45 %
Freezers Ice Cream—"Champion".....dis 33⅓ %
Gates—Molasses—
Patent Self-Measuring.....₱ doz., $42 00; dis 20 %
Hinges—Window Blind—
Clark's No. 20.....$1 50 per doz net
Wrought Strap and T.....dis 30 %
Hods, Coal—Plain, Black and Galvanized.....dis 35&7½ %
Funnel, Black and Galvanized.....dis 10 %
Fancy and Helmet.....dis 10 %
Palace Coal Vases.....dis 10 %
Hammers—Maydole s.....net
Yerkes & Plumb's.....net
Hooks and Staples—Wrought.....dis 5 @ 10 %
Hooks—Belt.....dis 60&10 %
Hasps and Staples—Wrought.....dis 50 %
Sad Irons.....dis 60&10 %
Kettles—Brass.....4½c
Enameled.....₱ ℔, 50 @ 55c
Knives, Drawing—Oval No. 1.....dis 40 %
Razor Blade.....dis 60&10 %
Lanterns "Peerless," No. 1 " 5 " 10 .....dis 50&10 %

	₱ doz	$26 00	$11 25	$13 75	dis 10 %
Tubular					$6 50
" with Guards					11 50
Gem, with guards					12 00

Machines—Apple Paring, "Reading,"..$8 00 @ 8 50 ₱ doz
Mills, Coffee—Box and Side, common.....dis 15 %
Box Union and Eagle.....dis 15 %
"Enterprise".....dis 20 %
Nails—Clout and Finishing.....dis 2½ %
Shoe.....dis 7½&5 %
Horse, Ausable.....

No.	5	6	7	8	9	10
	20	21	23	24	25	22c

" " Finished & Pointed.....add 1c ₱ ℔
" " 1000 lbs.....dis 5 %
" Clinton.....

No.	6	7	8	9	10
	22	20	19	18	17c

Packing—Rubber.....dis 30 @ 30&5 %
Pencils, Slate—Soapstone.....4 5 6in.
30 40 50c. ₱ 100
Case lots.
Paint—White Lead, U. S. Gov't.....dis 20 %
Rivets—Iron, Black and Tinned.....dis 20 @ 25 %
Copper.....₱ ℔ 9 c
Rope—Manila, ¼ inch and larger.....₱ ℔ 15½c
Rules—Boxwood and Ivory, Stephens.....dis 50 %
Screws—"American Screw Co"—
Flat Head, Iron.....dis 52½ %
Flat Head, Brass.....dis 52½ %
Staples—Blind, Boardman s Pat., ¼ & ⅜.....₱ ℔ 37c
Skates—White's.....dis 25 %
Barney & Berry's—N. Y. Club Japanned Top.....$2 20
B. & B. Club Blued Top.....2 85
Straps, Skate—Russet and Black.....dis 25 %
Spoons, Iron Tinned.....dis 10 %
" by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 30&5 %
Britannia.....dis 40 %
Squares—Steel and Iron.....new list 50 %
Shoes, Horse—H. Burden & Sons.....₱ keg $5 50
Shovels & Spades—Shenard, Forsyth & Dennison..dis 20 %
Saws—Henry Disston & Sons.....dis 10 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 15 %
Shears—Sevinour's.....dis 60 %
Trans, Steel—Newhouse.....dis 20 %
Tacks—Half Weight Am. Iron.....dis 50&7½ %
Vises—Parallel, Buffalo.....dis 15 %
Wrenches—Coes' genuine.....dis 40 %
Coes' Imitation.....dis 50&10 %
Tafts' Pattern.....dis 65&10 %
Ware—French, Tinned and Iron.....dis 30
Stamped and Japanned.....net
Cast Iron Hollow.....dis 25 %
Tin Plates.—Add for each X.....2 50
10x15, IC. Charcoal...$13 00 / 14x20 " terne...11 75 @ 12 00
12x12, " ... 13 50 / 20x28 C. " ... 25 00
12½x17, " ... 12 00 / 20x28 X. " ... 29 25
14x20, " ... 14 00
Pig Tin—Straits.....85c @ 86
Bar Tin.....87c
Solder.....No. 1, 20 c; No. 2, 15 c
Sheet Zinc—"Lasalle".....

	570	100 ℔ casks
	$10 00	10 50 ₱ 100 lbs

Sheets.....$10 00
Iron Wire—Bright and Annealed.....dis 35 %
Coppered.....dis 30 %
Tinned.....dis 15 %
Tinned Broom, No. 20 / 21 / 22 / 20c / 21c / 21c .....dis 20 %
Copper—Sheathing 14 @ 18 oz.....₱ ℔ 33c
Planished.....₱ ℔ 39 @ 41c
Bottoms.....₱ ℔ 35c
Bolts.....₱ ℔ 35c
Brazers' Sheets.....₱ ℔ 37c
Sheet Iron.—
18 Common.....$5 30
24 Common.....5 50
24 W. D. Wood & Co., Smooth Finish.....6 10
Am. Russia.....A. B.
Gen. Russia, No. 1 stained.....14c 11c
" " clean.....21c
Galvanized.....dis 15 %

PITTSBURGH.

Card Rates, 60 days.

Flat Bar.—
1¼ to 4 x ⅛ to 1 inch..3⅞c
4¼ to 6 x ⅛ to 1 inch..3⅝c
1¾ to 6 x 1⅛ to 1½ in..3⅞c
Horse Shoes.—
All sizes.....4⅜c
Heavy Bands.—
3¼ to 6 x ¼ & 5-16 in..3⅝c
1¾ to 3¼ x ¼ & 5-16 in..4⅛c
Light Bands.—
3 to 6 x 5-16 to No. 12..4⅜c
1¾ to 2¾ x 5-16 to No. 12.....4⅝c
Hoops.—2¾ to 3 in.....4⅝c
3¼ to 4¾ in.....4⅜c
1¾ to 2 in.....4⅛c
1¾ to 1 11-16 in.....3⅞c
1¼ & 1¾ in.....3⅝c
1¼ & 1¾ x ⅛ to ¼ in....3⅝c
1 & 1¾ x ⅛ to ¼ in.....3⅝c
⅝, ¾ & ⅞ x ⅛ to ¼ in..3⅞c
Nail rods.....7 2c
¼ to 1¼ x ¼ & 5-16 in....4⅜c
⅛ to ¾ x ¼ & 5-16 in....4⅝c
1 to 1¾ x 5-16 to No. 12..5⅛c
⅛ to ¾ x 5-16 to No. 12..5⅝c
1 in.....5⅜c
⅞ in.....5⅝c
¾ in.....6⅛c
⅝ in.....6⅝c
½ in.....7⅜c
⅜ in.....7⅝c
½ to 7-16.....4⅞c
⅜ in.....4⅝c
5-16 in.....4⅝c
¼ in.....4⅜c
3-16 in.....4⅛c
Oval Iron.—
⅞ to 1¼ in.....3⅝c
⅝ to ⅞ in.....4⅛c
Half Oval and Half Round.—
⅞ to 1¼ in.....4⅜c
⅝ to ⅞ in.....4⅞c
Round and Square.—
1 to 1¼ in.....3⅜c
2 to 2¾ in.....3⅝c
3 to 3¼ in.....3⅞c
3¼ to 4 in.....4⅜c
⅝ to 9-16 in.....3⅛c
½ in.....4⅜c
⅜ in.....4⅝c
¼ in.....4⅞c
5-16 in.....5⅛c
⅜ in.....5⅝c
7-16 in.....6⅛c
½ in.....6⅝c
9-16 in.....7⅜c
⅝ in.....7⅝c
¾ in.....8⅛c
⅞ in.....8⅝c
1 in.....9⅛c
1¼ in.....9⅝c
1½ in.....10⅛c
1¾ in.....10⅝c
2 in.....11⅛c
2¼ in.....11⅝c
2½ in.....12⅛c
2¾ in.....12⅝c
3 in.....13⅛c
3¼ in.....13⅝c
3½ in.....14⅛c
3¾ in.....14⅝c
4 in.....15⅛c
Tank Iron.—
5-16, ⅜ & ½ in. thick..5⅜c
Boiler Plate Iron....5⅝c
Heads not flanging....6 2c
Railroad Iron—Countersunk and Punched.—
1¼ x ⅜, 7-16 & ½ in ...4⅜c
1¼ x ¼ & 5-16 in.....3⅝c
Extras for Cutting to Length.—
Flat bars and rounds and squares.....6 1c
Flat bars for tire.....6 1c
Light bands and wagon box iron.....6 2c
Hoops.....6 3c

	Bolted.	Charcoal.	Jun.
Sheet Iron, 10 to 14	5 3	6 8	8 3
" 15 to 20	5 5	7 0	8 5
" 21 to 24	5 7	7 2	8 7
" 25 to 26	5 9	7 4	8 9
" 27	6 1	7 6	9 1

All sheets over 28 in. wide, ¼c. ₱ ℔ extra.

The following are the Card rates of Lewis, Oliver & Phillips:
Iron, standard list, assorted sizes, for large orders, 3⅜c, card rate, 2 % off net.
Flat Rail (1¼x¼), punched and coun'sunk..4 7c ₱ ℔ net
Iron Wedges.....5c ₱ ℔ net
Norway Nail Rods.....9½c ₱ ℔ net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point).....6 c ₱ ℔ net
Beetle Rings.....9½c ₱ ℔ net
Fence Pickets—
⅝ round, bent to shape..80c ₱ ft. of fence, less 5 % off net
Discount off Standard List.
Carriage and Tire Bolts (new list).....70&5 % off net
Plow Bolts.....35&5 % off net
Stove Bolts.....5 % off net
Machine and Square Head Bolts.....30 % off net
Coach and Lag Screws.....30 % off net
Bolt Ends.....25 % off net
Harrow Teeth, in lots of 1 ton or more, packed in casks, 1 in. diam. 3¼c ₱ ℔ net; ⅞ in. diam. 3⅜c ₱ ℔ net; ¾ in. diam. 4¼c ₱ ℔ net.
Patent Headed Harrow Teeth, packed in casks, ½c ₱ ℔ ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 7c ₱ ℔ net; 9-16 in. diam. 8c ₱ ℔ net; ½ in. diam. 9c ₱ ℔ net. 1c ℔ extra when less than 1 keg of each size is ordered.
Screw Hook and Eye Hinges, ⅝ to 1 in. diam. 9½c ₱ ℔ net; ⅜ in. diam. 10½c ₱ ℔ net; ¼ in. diam. 12½c ₱ ℔ net.
Screw and Strap Hinges, in lots of 100 pairs or more, 14 to 16 in. long, 6c ₱ ℔ net; 8, 10 & 12 in. long, 7½c ₱ ℔ net.
Strap and T Hinges..40 % off net, delivered as customary
Screw Hitching Rings.....$5 50 ₱ 100 net
Dur'k Neat Tuvere Irons.....$15 00 ₱ doz net
Cast Iron Washers.....₱ ℔ 4½c net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₱ ℔ 4½c net
1 to 2 in. diam. from 4 to 8 ft. long..... " 4¾c net
1 to 2 in. diam. from 1½ to 4 ft. long..... " 5½c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long..... " 5¾c net
⅝, ¾ and ⅞ in. diam. from 1½ to 4 ft. long " 6¼c net

WAGON HARDWARE.

Wagon Box Strap Bolts—
10 in. long by 7-16 at Screw End, ₱ set of 8 bolts.. 55c
12 " ½ " " 8 " .. 70c
10 " 9-16 " " 8 " .. } 90c
12 " 9-16 " " 8 " .. }
14 " 9-16 " " 8 " .. $1 00
10 in. long by ⅝ at Screw End, ₱ set of 8 bolts.. } 1 00
12 " ⅝ " " 8 " .. }
14 " ⅝ " " 8 " .. 1 10
16 " ⅝ " " 8 " .. 1 20
5c ₱ set for each additional inch over 14 in. All lengths made.
Wagon Box Rods, narrow track, each.....18c
" " wide track, each.....20c
Single Tree Irons, ₱ set of four pieces.....38c
Wrought Iron Bolster Plates, 2¾ in. wide, ₱ set.....60c
" " 3 " " 65c
" " 3¼ " " 70c
" " 3½ " " 75c
Wagon Brake Ratchets, each.....16½c
" " finished with guard, each..45 c
Wrought Hammer Straps, heavy pattern, each.....16 c
" " light " each.....13½c
" Rub Irons, each.....11 c
Stay Chain Hooks, each.....8 c
Double and Single Tree Clips, figure 1, each.....9 c
" " " 2, each.....10 c
" " " 3, each.....12 c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 100 sets.....dis 25 %
Wagon Box Staples 1½ to 2¾ in. to clinch, ₱ 1000 $12 50 net
" " Box Iron, to rivet on, ₱ 1000 8 50 net
Neck Yoke Eyes, each.....5¾c net
" " with ⅝ rings, each.....8 c net
King Bolts, ¾, 1, 1¼, and 1½ in. diam.....₱ ℔ 4¼c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¼ in. diam, all lengths..... " 9 c net
Wagon Rivets, 5-16 in. diam., all lengths..... " 11 c net
" " & Nails, in 5 ℔ paper boxes....₱ ℔ 1c extra
" " " in 25 ℔ wood " .....½c extra
Wagon and Hinge Nails, ¼ in.....₱ ℔ 17 c net
" " " 3-16 in..... " 19 c net
Double Tree Plates, Coupling " , Tongue " } " 9 c net
Neck Yoke Plates..... " 12 c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₱ ℔ as Band Iron.
Wagon Chains, Stay Lock and Tongue, 5-16 in, ₱ ℔ 11¼c net ¼ in., 12½c. net

DETROIT.

(Reported by Messrs. Jewett & Root.)

Tin Plate.—Best Charcoal

IC, 10x14	$13 00
IX, 10x14	15 75
XX, 10x14	18 50
IC, 12x12	13 50
IX, 12x12	16 25
IC, 14x20	14 00
IX, 14x20	16 75
XX, 14x20	19 50
XXX, 14x20	22 25
XXXX, 14x20	25 00
DC, 100 Plate	12 50
DX "	15 25
DXX, "	18 00
DXXX "	20 75
DXXXX 100 Plate	23 50
IX, 14x14	25 00
IC, 10x14 W	12 50
IX, 10x14 W	15 25

Roofing Tin.—Best Char.

IC, Terne, 14x20	$12 25
IX, " 14x20	15 00
IC, Terne, 20x28	24 00
IX, " 20x28	30 50

Coke Tin.—

IC, 10x14 Coke	$11 00
IX, 10x14, Coke	13 75
IC, 14x20, "	12 00

Sheet Zinc.—Any width.....10 c

Copper.—
Sheathing.....28c
Copper Bottoms.....35c
Planished Copper.—
Sheathing, 14x48.....41c
Boiler Size, No. 7.....43c
" " No. 8.....43c
" " No. 9.....43c
Pig Tin.—Large Pigs..15c
Small Pigs.....16c
Bars.....17c
Solder.—No. 1.....18c
No. 2.....20c
Bright Wire......dis 55 %
Sheet Iron.—
No. 18 Am. Com.....5 50
No. 24 Am. Com.....5 50
Pat. Am. Russia "A,"
Nos. 24, 25 & 26.....c
Pat. Planished Russia.....c
Russia No. 9, 10, 11&12.....c
W. D. WOOD'S & CO.'S SHEET IRON.—
Nos. 15 to 20 Smooth $6 10
" 21 to 24..... 6 50
" 25 & 26..... 6 80
" 21 to 24 Charl'l.. 7 80
" 25 & 26 " 8 00

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal.....$12 00 @ 14 00
I. X. 10x14 Charcoal.....15 50 @ 17 00
I. C. Terne 14x20.....11 00 @ 13 00
I. C. Terne 20x28.....24 00 @ 25 50
I. C. Continuous.....28 00
Block Tin.—
Pigs.....37½c @ 38c
Bars.....₱ ℔ 39c
Solder.—
S. & Co.....₱ ℔ 28c
A 1.....₱ ℔ 24c
Roofing " 22c
Lead.—Pig..₱ ℔, 7¼c @ 8c.
Bar.....₱ ℔ 8c @ 9c
Copper.—
Ingot.....₱ ℔ —
Plantshed... " @ 40c
Sheathing.. " @ 35c
Copper Drops 37c @ 38c
Zinc.—Cast, 500 to 1000 lbs.....₱ ℔ 11 c
Case, 100 lbs..... " 11½c
Slab..... " 8½c @ 9c
Brass.—
Roll, No. 6 to 30.₱ ℔ 45c
" 30 to 38. " 65c
Babbit Metal.—
Sellew & Co.....₱ ℔ 38c
Sheets, 6 to 9 lb...₱ ℔ 41c
" 10 to 12 lb... " 38c
Braziers 13 lb..... " 35c
Copper Bottoms.. " —
Roll, No. 38 to 40... ₱ ℔ 50c
Wire, No. 0 to 20...₱ ℔ 50c
" 20 to 25... " 60c
Black Lead.....₱ ℔ 25c
Market.....15c
Antimony.....₱ ℔ 20c
Bismuth.....₱ ℔ $6 00
Nickel.....₱ ℔ $3 00
Sheet Iron.—
Russia.....₱ ℔ 20c @ 22c

	Com. B.	Am Russia A.	B.
15 to 20	6 0c	14 @ 15c	13 @ 14c
22 to 24	6 2c	7 8c	9 2c
26	6 4c	8 0c	9 4c
27	6 6c	8 2c	9 6c

Galvanized Iron.—Full bundles.....dis 25 %

Nos.	Smooth Fin.	Smooth S. I. U.	Smooth D Re'd.
18 to 20	15c	7 5c	9 0c
22 to 24	16c	7 8c	9 2c
25 to 26	17c	8 0c	9 4c
27		8 2c	9 6c
28			20c

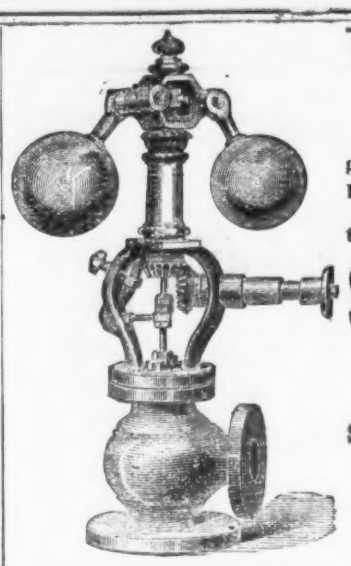
Bar Steel.—Silver, ₱ ℔ 21c; Crescent, 17¼c.
Iron Wire.....dis 25 %
Enameled Ware.....dis 33⅓ %
One Piece Corrugated Elbows.....dis 10 %
Iron Gas Pipe.....dis 65 %

Charcoal Iron.		Russia Iron.	
4½ inch.....	₱ doz $3 75	4½ inch.....	₱ doz $8 00
5 "	" 4 25	5 "	" 10 00
5½ "	" 5 25	5½ "	" 13 00
6 "	" 5 25	6 "	" 13 00
7 "	" 6 50	7 "	" 14 00

Leader Elbows—Flat Crimp Retinued.—

	₱ doz.		₱ doz
2-inch	$2 00	2½-inch	$2 25
3-inch	2 50	3½-inch	3 00
4-inch	3 50	4½-inch	4 00

Sheet Iron Bread Pans.....₱ ℔ 12c
American Broilers.....₱ doz., 41.50
Tinmen's Machines.....net list
Sad Irons.....₱ ℔, 5½c
Brass Kettles.—Ausonia.....45c



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BEST CAST STEEL FILES, SAWS, EDGE TOOLS,
HACKLES, GILLS, CARD CLOTHING, CARD TEETH, HACKLE AND GILL PINS,
FISH HOOKS, NEEDLES. &c.

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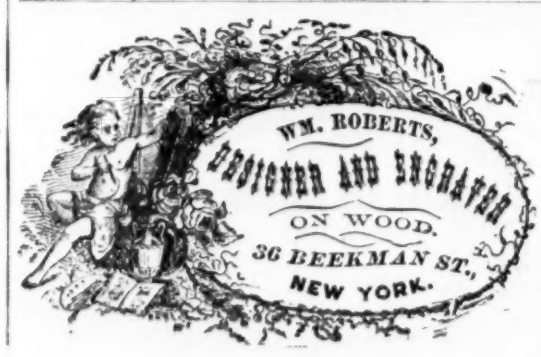

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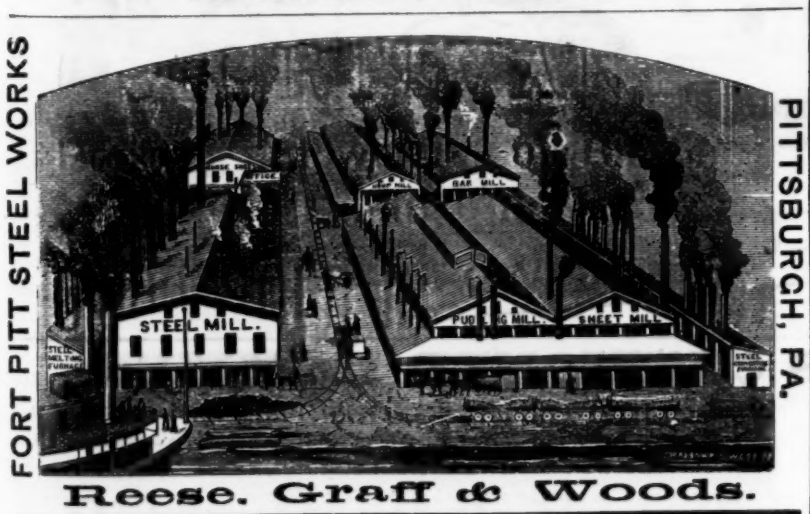

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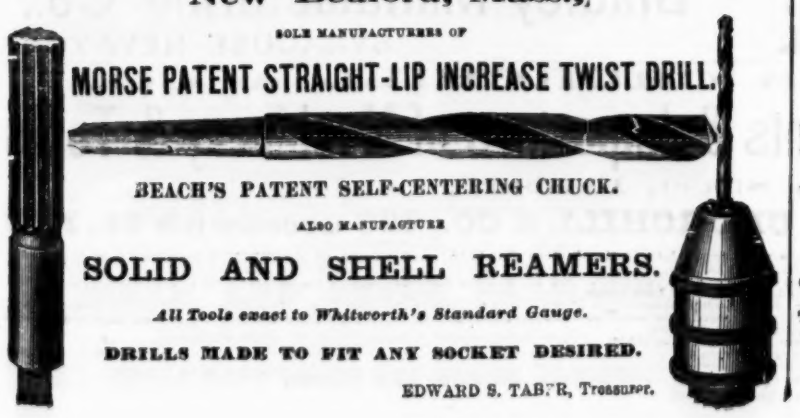

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Scythes—Dunn Edge Tool Co.....dis 30 %
Hay and Manure Forks—Otsego extra C. S.....dis 30 %
Hoes and Garden Rakes—Jackson and Otsego...dis 30 %
Scythe Stones.....dis 25 %
Scythe and Bush Snathes.....dis 25 %
Harvest Rakes and Barley Forks.....dis 25 %
Revolving Horse Rakes.....dis 25 %
Handles—Fork and Shovel.....dis 25 %
Cradles—Nithington, Cooley & Co.....dis 25 %
—Genuine Morgan.....₱ doz net $34 00

Augers and Bits.—
Ives' extra C. S....dis 30 % | Snell's.....dis 10 %
Jennings'.....dis 5 % | " Car Bits.....dis 10 %
Cook's.....dis 30 %

Axes.—Amoskeag Yankee.....₱ doz $13 50
Amoskeag Crescent..... " 14 00
Hunt's Yankee..... " 14 00
Kennebeck Yankee..... " 12 00
Lippincott " ..... " 13 00
" Crown..... " 14 00
" Beveled..... " 14 50
Jefford's Silver Steel..... " 13 00
Red Warrior, Beveled..... " 14 00
Kennebeck, Handled..... " 15 00
Boy's, Handled..... " 12 00

Bolts.—Carriage and Tire.....dis 75 %
Cast Barrel and Shutter.....dis 20&10 %
Wrought Iron Barrel.....add 10 %
" " Square.....net list

Butts.—Cast Fast Joint, Narrow.....dis 30 %
Cast Fast Joint, Broad.....dis 30 %
" Loose Joint.....dis 35 %
" " Pin, Reversible.....dis 35 %
" " Japanned.....dis 35 %
" " Silver Tipped.....dis 35 %
Wrought Narrow, Fast Joint.....dis 30 %
" Broad " " .....dis 30 %
" " Loose " .....dis 30 %
" Loose Pin.....dis 30 %
" Table.....dis 30 %
" Brass.....dis 10 %
Garretson's Blind Butts, Wood.....doz sets $1 75
" " Brick.....doz sets 2 75
Parker's " Wood.....doz sets 1 85
" " Brick.....doz sets 2 75

Casters.—Iron Plate.....dis 25 %
Brass Wheel Plate.....dis 25 %
Porcelain Wheel Plate.....dis 25 %
" " Bed.....dis 25 %
Iron Wheel Bed.....dis 25 %

Chisels.—Butcher's Tanged Firmer.....dis 30 %
" Long Paring.....dis 30 %
Witherby Socket Framing.....dis 50&20 %
" " Firmer.....dis 50&20 %
" " Corner.....dis 50&20 %
" " Slicks.....dis 50&20 %

Coffee Mills.
Box 4 Iron.....$ 3 75 | Box 85 Cast Steel.....$12 00
" 103 " ..... 5 25 | Side 50..... 4 75
" 102 " ..... 6 25 | " 60..... 5 75
" 107 Britannia..... 7 50 | " 70..... 7 25
" 106 " ..... 8 50 | " 90..... 13 00
" 25 Union..... 10 50 | " 15 Union..... 7 00
" 35 " ..... 12 00 | " 20 " 8 00
" 75 Cast Steel.. 10 50

Cutlery.—American Table.....dis 20 %
" Pocket.....dis 25 %

Door Springs.—Torry.....₱ doz $5 50
Rubber..... " 4 00
Boon's..... " 5 00

Drawing Knives.—Witherby Tool Co....dis 50&20 %
Ohio Tool Co.....net list

Files.—Butcher's.....$7 00 £
Nicholson's.....$5 00 @ $5 50 £

Hammers.—
Maydole's.....net list | Yerks & Plumb.....net list
| Chency.....net list

Handles.
Extra Axe..₱ doz. $3 00 | Coal Pick, No. 1..₱ doz $2 00
No. 1 Axe..... " 2 25 | Sledge, No. 1..... " 2 00
No. 2 Axe..... " 2 00 | Hatchet..... " 65
R.R. Pick, No. 1 " 2 00 | Hammer, A. E.. " 65

Hatchets.—
| 1 | 2 | 3
Amoskeag Shingling..... | $7 25 | $8 00 | $8 75
" Claw..... | 7 75 | 8 50 | 9 22
" Lath..... | 7 50 | 8 25 |
" Solid Steel..... | | | 12 00

Hinges.—Strap and T.....dis 25&7½ %
Screw Hook and Strap, 8 to 12 in.....net, 9c. ₱ lb
" " 14 to 24 in.....net, 7½c. ₱ lb
Hook and Eye Hinges.....net 12c. @ 16c. ₱ lb
Gate, No. 35, State.....₱ doz $3 50
" No. 3, In and Out..... " 3 50
" Blinn's Pat..... " 7 50

Horse Nails.—Northwestern, 8d.....24c
Ausable, 8d.....24c
Globe, 8d.....26c

Kettles.—Brass.....50c | Enameled.....dis 15 %

Locks and Knobs.—
Norwalk Lock Co. dis | EagleLock Co.....dis 15 %
Branford " dis | Am. Pad Locks.....dis 25 %
| Cont'al Lock Co. ..dis 10 %
| Woodrun Patent ...net list
| Stowe's Sausage Stuffers.....net list
| Enterprise Patent...dis 5 %

Meat Cutters.—
Haven's Patent ...net list
Hale's " ...dis 10 %

Molasses Gates.—
Stebbin's Patent ..dis 50 %

Nails.—10d to 60d.....per keg $4 25 @ 4 37½

Oil Stones.—Washita No. 1.....net 30c ₱ lb
Washita Slips.....net 60c "
Hindostan No. 1.....net 9c "
" Axe.....net 50c "
" Slips.....net 15c "

Picks and Mattocks.—Picks, Railroad, Axe Finish.....₱ doz $12 00
Picks, Coal, Axe Finish..... " 10 00
Mattocks, L. C., Axe Finish..... " 15 00
" S. C..... " 14 50
Grub Hoes, Axe Finish, No. 2..... " 9 00

Planes.—Ohio Tool Co., Bench.....dis 25 %
Sciota.....dis 30 %
A. Howland & Co., Bench.....dis 25 %
" Fancy.....dis 25 %
Bailey Patent Iron.....dis 15 %
Plane Irons, Butcher's.....dis 30 %

Rivets.—Iron..dis 10 @ 15 % | Copper, No. 7..net, ₱ lb, 35c
Tinned.....dis 10 @ 15 %

Rules.—Stanley Rule and Level Co.....dis 50&10 %
Hubbard & Curtiss Mfg. Co.....dis 50&10 %

Sad Irons.—Best A No. 1..... ₱ lb, 4c
" Copper Face Star..... ₱ lb, 4½c

Sandpaper.
Baeder & Adamson's No. 0 to 1½.....per ream, net $4 50
No. 2 to 3..... " net 5 00
Wiggin & Stevens, No. 0 to 1½..... ₱ ream, net, $4 50
" No. 2 to 3..... " 5 00

Sash Locks.—Champion.....₱ gross, net, $12 00
Hopkins & Dickinson.....dis 10 %
Judd's Patent.....dis 10 %
Corbin's Patent.....dis 10 %
Clark's Patent.....dis 20 %

Saws.—H. Disston & Sons.....dis 10 %
Champion X Cut.....₱ foot, net, 60c
M. A. & Co. X Cut..... " 50c
Lightning Cut..... " 66c

Screws.—American Screw Co.—Iron..new list dis 50 %
American Screw Co.—Brass.....dis 50 %

Shovels and Spades.
Ames' Black Shovels.....₱ doz $14 50
" Polished " ..... " 15 50
" Patent " ..... " 18 00
Alling " " ..... " 16 00
" " " Molders'..... " 18 00
Crane's Black " ..... " 11 50
" Polished " ..... " 12 00
Smith's " " B. S. L. H. Rd. Pt.... " 13 50
" " " B. S. D. H. Rd. Pt.... " 14 00
Ames' Black Spades..... " 16 00
" Polished " ..... " 17 00
" Patent " ..... " 17 50
Alling " ..... " 16 00
Crane's Black " ..... " 12 50
" Polish'd " ..... " 13 50

Scoops.—Alling Steel Polished, No. 2.....₱ doz, $13 50
Alling Steeled Polished, No. 3..... " 14 00
" " No. 4..... " 14 50
" " No. 5..... " 15 50
" " No. 6..... " 16 50
" " No. 7..... " 17 50
" " No. 8..... " 18 50
" " No. 10..... " 21 50
Crane's Polished, No. 5..... " 13 50
" No. 6..... " 14 50
" No. 7..... " 15 50
" No. 8..... " 16 50
Crane's Black Coal, No. 4..... " 17 50
" " No. 5..... " 18 00
Preston, Black Scoops No. 1..... " 12 00
" " No. 2..... " 12 50
" " No. 3..... " 13 00
" Half Pol. Scoops No. 1..... " 12 50
" " " No. 2..... " 13 50
" " " No. 3..... " 14 50
Lippincott, Half Pol. No. 2..... " 15 00
" " No. 3..... " 16 00

Wrenches.—Taft's.....dis 60 %
Coe's Imitation.....dis 50 %
Coe's Genuine.....dis 30 %

Wringers.—Novelty Clothes Wringer.....₱ doz $69 00
Universal Clothes Wringer..... " 72 00

Chicago Metal Market.

(Reported by Cragin Bros. & Chandler, 141, 143, and 145 Lake St.)

Tin Plate.—
IC, 20x14, Coke.....$12 50 | IXX, 14x20, Charcoal. 20 50
IC, 10x14, Charcoal. 13 50 | IXXX, 14x20, " 25 50
IX, 10x14 " 16 50 | IXXXX, 14x20, " 26 50
IC, 12x12, " 14 00 | IX, 14x14, " 27 50
IX, 12x12, " 17 00 | DC, 100 Plate, " 13 50
IC, 14x20, " 14 50 | DX " 16 50
IX 14x20, " 17 50 | DXX " 19 50
| DXXX, " 23 50
IC, 14x20, Coke Roofing..... 20 00
IC, 10x20 Coke, for Gutters..... 15 00
IC, 14x20, Charcoal Roofing..... 16 00
IX, 14x20 " 16 00
IC, 20x28, " 26 00
IX, 20x28, " 30 00

Pig Tin.— Small, 30 ₱.....39c
Large, 60 ₱.....38c | Bar Tin.....40c

Zinc.—
In casks 1000 ₱ s..... c | In sheets..... 11 c
" 500 " .....10 c | Slab..... 9c

Copper.—Copper Bottoms.....37c
Sheathing Copper.....36c
Planished Copper.....41c
" " cut to lengths.....43c

Braziers' Sheets, 30x 60.—6 to 8 lbs.....46 c
10 and 12 lbs..... 43c

Solder.—Extra Fine, C. B. & Co.'s Brand .25c
Fine, No. 1..... 23c

15 to 100 lbs.....40c
Ingot Copper.....
Bolt " 45c
Ordinary, No.....21c
Plumbers' Solder.....25c
Braz'rs' or Spelt'r Solder 35c

Antimony......20c

Rabbit Metal......15c @ 25c.

Galvanized Iron Conductor Pipe......₱ ₱ 10c

Sheet Iron.—
| Common. | Smooth. | Charcoal.
No. 14 to 24..... | 5¾c | 6¾c | 8¾c
25 & 26..... | 6 c | 7 c | 8¾c
27..... | 6¼c | 7¼c | 9 c
Add ¼c ₱ ₱ for 30 in. wide.

Galvanized Iron......dis 15 %
No. 16 to 20.....12c | No. 27.....15c
21 to 24.....13c | 28.....16c
25 & 26.....14c

Russia Iron.— | No. 1 Stained.....20c
Perfect.....22c | In Sheets, 1c. higher.

American Russia.— | B.....11c
A.....14c | In sheets, 1c higher.

Lead.— | Lead Pipe, in full coils 10½c
Pig.....8½c | Lead Pipe, when cut. 11c
Bar.....10c | Sheet Lead.....10½c

BOSTON.

(Reported by Macomber, Bigelow & Dowse, 42 to 48 Batterymarch St.)

Anvils.—Eagle, ₱ ₱ 11c. currency.....dis 15 @ 15&5 %

Axes.—Forester's Favorite, Bronzed.....$13 00
Blue Jackets, Blue..... 12 50
Chopper's Pride, Bronzed..... 11 00
Red Cross, Red..... 10 50
Red Cross, Handled..... 13 50
Boy's Handled Blue Jackets..... 12 00
Hunts Axes.....₱ doz $15 @ 17 50 net @ 5 %
" Hatchets.....net

Shingling Nos. 1, 2, 3......₱ doz $7 25 8 00 8 75
Claw " 1, 2, 3..... " 7 75 8 50 9 25
Lathing " 1, 2, 3..... " 7 50 8 25 9 00

Axe Handles.—Hickory, Fisher Pat. No. 1 ₱ doz $2 75
Hickory, Fisher Pattern..... " 2 " 2 00
Oak, " " ..... " 1 " 2 75
" " " ..... " 2 " 2 00
" " " ..... " 3 " 1 50

Bells.—Hand.....dis 60&10 %

Bolts.—Carriage, Phila.. "Girard Works".....dis 50 %

Borers.—Angle, Backus.....dis 30 %

Boring Machines.—Angle.....each $4 75
Common. Snell's quality.....each 3 75

Breast Drills.—Miller's Falls, $30 per doz.....dis 25 %

Braces.—Barber's.....dis 40 %
Backus'.....dis 50 %
Spofford's.....dis 40 %

Butts.—Union Drilled Loose Joint.....dis 50 %
" " Acorn Loose Joint.....dis 50 %
" " Fast Narrow.....dis 50 %
Brass Butts.....dis 30 %
Wrought Table Butts and Back Flaps.....dis 30 %
Wrought Narrow Butts.....dis 30 %

Carriage Jacks.—Young Americus.....₱ doz $21 00

Cartridges.—" U. S. Cartridge Co."..... dis 50 %

Chisels.—
Socket Framing M., B. & D's, warranted...dis 60&10 %

Cordage.—Manila.....₱ lb, 16½c
American Tarred Hemp Lath Yarn.....₱ lb, 10c

Cow Ties.—
No. 30, open ring, 3 ft., No. 6, with toggle..₱ doz $3 37
No. 35 " 3 ft., No. 6 " snap...₱ doz 3 62
No. 40 " 3½ ft., No. 5 " toggle..₱ doz 3 75
No. 45 " 3½ ft., No. 5 " snap...₱ doz 4 00
No. 50 " 4 ft., No. 4 " toggle..₱ doz 4 25
No. 55 " 4 ft., No. 4 " snap...₱ doz 4 50
No. 60 " 4½ ft., No. 3 " toggle..₱ doz 4 50
No. 65 " 4½ ft., No. 3 " snap...₱ doz 5 00

Crow Bars.—Iron, Steel Points.....₱ lb, 5½c

Door Springs.—Stimson's Patent.—
No. 7, Light Inside doors, $12 00.....dis 25 %
No. 8, " outside " $15 00.....dis 25 %
Torrey's.....$4 00

Files.—Earl Smith & Co.'s English.....$5 to £ gold
American.....$5 to £ currency, less 10 %
Nicholson.....$5 to £ currency, less 10 %

Funnel Irons.—$2 50 $2 50 $2 50 $3 25 per doz
5, 5½, 6, 7 inch
Deep Flange, $3 50 $3 75 $4 00 per doz
5, 5½, 6 inch

Hammers.—Maydole.....dis 5 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $9 75; $11; 1½, $9 75.
" " " " " bell face, No. 1, $11; 1½, $9 75.

Hangers & Rollers.—Novelty.....dis 30 %

Hatchets.—Underhill Edge Tool Co.....dis 10 %
Underhill pattern, solid, C. S. lathing.....$9 50

Hinges.—Strap and T, Stanley Works.....dis 25&7½ %
Wrought Screw Hook.....₱ lb 8c

Locks.—P. & F. Corbin.....new list dis 50 & 5 %

Mattocks.—K. P. & Co.. axe finish, long cutter..$13 75
Short cutter..... 13 50

Meat Cutters.—"Miles"..... dis 20 %
No. 1, $22; No. 2, $30; No. 3, $40 per doz.
American, $6 each.....dis 25 %

Metal.—Babbitt, No. 1, 35c; 3, 25c; 8, 16c. 4, 15c ₱ lb

Nails.—10's and larger.....$4 15

Paper.—Finest Quality Manila.....₱ lb 11c

Pavers.—Reading, New Pattern.....per doz $8 00
Turn Table.....per doz 8 50

Picks.—K. P. & Co., Polished Points—
5 to 6.....per doz $10 00; 6 to 7, $10 50

Pulleys.—Clark & Co.'s Axle, 1¼ in.—
.....per doz 37c.; 2 in., 42c

Plated Ware.—Rogers Bros.....new list dis 30 %

Plumb & Levels.—"Davis" Pat. Adjust..dis 50&10 %
" Davis" Pat. Adjustable Inclinometer, wood and iron.....dis 33⅓ %

Pocket Knives.—Conn. Cutlery Co.....new net list

Rivets.—Black.....dis 25 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8.
13 13 14 14 15 16c ₱ ₱ net

Sad Irons.—Reading.....₱ ₱ 4¾

Sand Paper.—0 to 2, $4 25; 2 to 3, $4 75.....dis 10 %

Saws.—Disston's.....dis 12½ %
Lightning X cut, Boynton's.....per foot 6½c
" Saw Blades, 32 inch.....per doz $7 00
" Framed Saws.....per doz $9 00
Common " " .....per doz 6 00
Disston " " .....per doz 9 00
One man X cut.—Lightning.....$2 75 each
Disston's $3 00 each.....dis 12½ %

Scythe Stones.—
"Willoughby Lake," first quality.....₱ gross $6 50
" " second quality..... " 3 00

Saw Clamps.—Reading.....$11 25

Screws.—American Screw Co..... new list dis 52½ %

Shovels.—O. Ames.....new list dis 12½ %
M. B. & D.....new list dis 12½ %
Snow, malleable iron tip, D handle.....$6 50
" " plain..... 5 50
Carr's Iron, Black Strap...Black, $5 50; Polished, $6 50
Collins, C. S.....$8 00

Sifters, Coal.—McMasters.....$12 00

Sinks.—Cast Iron, 2, 2½, 3, 3½, 4, 4½ feet.
$1 37 $1 62 $2 25 $2 75 $3 75 $4 75 each.

Tools.—Aiken's Pattern, 20 in set; Miller's Falls, $12 00 per doz.....dis 15 %

Traps.—Oneida.....dis 20 %
Blake's.....dis 20&5 %

Vises.—K. P. & Co.'s Solid Box, Blacksmith...₱ lb 14½c
Parker's Parallel.....dis 10 %
Backus.....dis 25 %
"Howards." Parallel.....dis 15 %
Fisher & Norris' Double Screw Parall'l..dis 15 @ 15&5 %

Weights.—Window Weights.....₱ lb 2½c

Wrenches.—Coe's Genuine Wrenches.....dis 40 %

Wringers.—
Novelty and Universal } Tub No. 2 } less than 5 doz..₱ doz $ 72 00
5 doz..₱ doz 69 00
10 doz..₱ doz 67 00
Monitor, Double Cogs.....per doz 66 00
Novelty Bench, No. 4, } less than 5 doz..₱ doz 108 00
5 doz..₱ doz 104 00
10 doz..₱ doz 101 00

Boston Metal Market.

(Corrected by Fuller, Dana & Fitz.)

Tin Plates.—₱ box
I. C. Char. 10x14 @ $12 50 | Char. Roof. I C, 10x14 $12 00
I. C. Coke 10x14.. 11 00 | Coke " I C, 10x14 11 00

Pig Tin.— ₱ ₱ | Straits..... 32c
Banca..... 39c | English..... 32c

Copper.— ₱ ₱ | Bolt..... 36c
Sheathing..... 33c | Ingot..... 26c

Lead.— ₱ ₱ | Sheet and Pipe..... 9c
Pig..... 7½c

Spelter......₱ ₱ 9½c

Zinc.—Sheet..... ₱ ₱ 10½c

Antimony...... " 16c

Iron.—Sheet Iron, Russia..... " 20c
Sheet Iron, English..... " 6½c
" " American Refined..... " 8½c
" " Galvanized..... " 11½c
Plate Iron..... " 4½
Swedish and Norway Bar Iron, gold.....₱ ton, $137 50
" " Shapes, gold..... " 147 50
Norway Nail Rods, first quality, gold..... " 165 00
" second " " ..... " 150 00
Best Refined Bar Iron..... " 75 00
The "Burden Best" Iron..... " 112 00
American Pig Iron, Foundry, No. 1, x..... " 38 50
" " No. 2, x..... " 36 50
" " Gray Forge..... " 33 50
Scotch Pig Iron.....₱ ton 46 00 @ 51 00
Wrought Scrap Iron..... " 45 00

Steel.— ₱ ₱ | German..... 11c
Eng. Tool..... 15c | Spring..... 8½c
American Tool 15½c | Tire..... 7½c
" Cast 11c | Sleigh Shoe..... 8½c
Bessemer.... 7½c | Toe Calk..... 8½c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Anvils.—Armitage.....₱ ₱, gold, 15c
Peter Wright's..... " 11c
Wilkinson's..... " 12½c

Apple Parers.—Conqueror.....₱ doz, $9 00
Lightning..... " 9 00
Turn Table..... " 9 00

Augers and Bits.—Cook's.....dis 25 %
Ives.....dis 20 %
Jennings.....dis 5 %
Snell's.....dis 12½ %

Axes.—Hunt's.....₱ doz $14 00 @ 15 00
Lippincott's..... " 13 00 @ 14 00
Lippincott's Pioneer..... " 13 50 @ 14 50
Simmons'..... " 13 00 @ 13 50

Axles.—Kritch & Crane Mfg. Co.'s—
Patent Taper Axles.....new list net
Swelled Taper Axles.....new list net
Concord Axles.....new list net
Red Jacket Axles.....new list net
Common Axles, 1½ inch and upward.....₱ ₱, 8½c
" " less than 1½ inch..... " 9½c

Bellows.—"Best St. Louis make" 60% ₱ in. dis 20 %

Bells.—Troy, Church.....₱ ₱, 50
Light Brass, Hand.....dis 50 %
Moore's, Cow.....dis 20 %

Bolts.—Arms, Bell & Co.'s Machine.....dis 20 %
Arms, Bell & Co.'s Carriage and Tire.....dis 70&15 %
Cast Iron Barrel, Shutter, &c.....dis 25 %

Cast Butt Hinges.—Narrow Fast Joint.....dis 33 %
Broad Fast Joint.....dis 40 %
" Loose " .....dis 50 %
Reversible.....dis 45 %
" Japanned and Silver Tipped.....dis 45 %
Loose Joint "Acorn" " " .....dis 40 %
Excelsior Reversible Blind.....dis 30&10 %
Lull & Porter's Blind.....dis 45 %

Wrought Butts.—Narrow.....dis 20 %
Reversible.....dis 25 %
Broad.....dis 25 %
Table Hinges.....net list
Back Flaps.....net list
Inside Blind Hinges.....net list

Chain.—Eng. Coil..3-16 ¼ 5-16 ⅜ 7-16 ½ in.
13 11 10 9½ 9 8c gold
Trace.....6½-10-2 70c "
7-10-2 75c "
German Coil and Halter.....revised list add 10 %

Chisels.—Socket, Firmer or Framing.....d 55 %

Clothes Wringers.—Crown.....₱ doz $60 00
Novelty..... " 72 00
Universal..... " 72 00
Monitor..... " 72 00

Corn Knives.—Dunn E'ge T'ol Co.'s Clip..₱ doz $5 75
Disston's..... " 6 00

Crow Bars.—Steel Pointed.....₱ ₱ 7 @ 9c
Solid Cast Steel..... 20c

Cutlery.—J. Russell & Co.'s.....
Lamson, Goodnow & Co.'s..... } new list, dis 15 %
Landers, Frary & Clark's.....

Files and Rasps.—
Nicholson's Mill Files.....$5 50 to the £, currency
Nicholson's Other Files..... 5 00 to 25c £ currency
Butcher's Mill..... 6 75 to the £ currency
Heller's & Bros Horse Rasps... 5 25 to the £, currency

Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks.....dis 30 %
" " Banded Hoes.....dis 10 %
" " Planter Eye Hoes.....list
Winsted's Planter Eye Hoes.....net list

Hammers.—Yerkes & Plumb.....new list net
Masons' Hammers..... ₱ ₱ 20c
Smith Hand Hammers..... " 22c

Handles.—Axe.....Extra. No. 1. No. 2. No. 3
$2 75 $2 25 $1 75 $1 00
Pick.....Extra. No. 1. No. 1½. No. 2.
$2 50 $2 00 $1 75 $1 25
Smith & Montrose Fork, Hoe and Rake.....dis 20 %
" " Broom and Mop.....$12 @ $18 ₱ M.

Harrow Teeth.—1 inch iron.....₱ ₱ 4½ c
⅞ and ⅝ inch Iron..... " 4¾ c
⅝ inch Iron..... " 5 c
Barbed or Headed.....½c extra

Hatchets.—Hunt's.....net list
Simmons'.....dis 10 %

Hay Knives.—Lightning.....₱ doz $22 00
Dunn Edge Tool Co.'s.....₱ doz $14 50—dis 15 %
Fisher's..... " 16 50—dis 10 %

Hinges.—Strap and T—St. Louis make.....dis 25 %

Horse Nails.—Eureka.....23c rate
Ausable.....22c "
Northwestern.....22c "
Eagle.....19c "
National Patent Pointed.....21c "
" " Extra Finished.....22c "

Horse Shoes.—R. I. (Perkin's pat.).....₱ keg $6 25
Burden's..... " 6 25
Mule Shoes..... " 7 25
Rhode Island Trotting Shoes..... " 8 75

Locks and Latches.—
Jones & Nimick's.....revised list dis 40 %
Moorhead, Adams & Co.....revised list dis 40 %
Norwalk Lock Co.'s.....revised list dis 40 %

Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks....₱ doz. $15 00 @ 16 00
" Grub Hoes, Oval Eye....₱ doz. 12 00 @ 13 00

Nails.—Wheeling..... $4 35 rates
Orders for 100 kegs 10c ₱ keg less.

Picks.—Klein, Logan & Co.'s R. R. and Clay ₱ doz.$12 00
Klein, Logan & Co.'s Coal..... " 9 75
" " Poll..... " 12 00
" " Stone..... " 16 50
" " Tamping..... " 19 00

Planes.—Ohio Tool Co.'s.....dis 20 %
Sciota.....dis 25 %

Post Hole Augers.—Clark's Patent—
No. 1, ₱ doz. $27; No. 2, $30; No. 3, $32.....dis 30 %
Barton's Patent..... ₱ doz $25—dis 30 %
Vaughn's " ..... " 25—dis 10 %

Sad Irons.—Monitor Brand, Silver Polished... ₱ lb 5c

Sash Weights.—Standard Solid Eyes.....₱ ₱ 3½c

Saws.—Disston's.....dis 10 %
Spear & Jackson's.....$5 00 to £ gold
Hubbard, Lippincott, B. & Co.'s.....dis 10 %
Branch, Crooks & Co.'s.....dis 10 %
Livingston's Patent Buck.....net list

Screws.—American Screw Co.'s revised list.....dis 45 %
$2000 worth in 6 months..... 2½ % extra

Scythes.—Blood's C. S. & G. S.....net list
Dunn Edge Tool Co.'s.....new list dis 15 %
Paris Furnace Co.'s.....dis 25 %
Waldron's English.....$10 00 to £

Scythe Stones.—No. 1 Ind'n Pond ₱ gr's, $7 00
Extra Indian Pond..... " 7 50
Premium..... " 9 50
Diamond Grit..... " 13 50
} dis 25 %

Shovels, Spades and Scoops.—
Ames'.....revised list dis 5 %
Lippincott's.....new list dis 10&5 %
Rowland's, Maxwell.....revised list dis 12½ %

Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished..... ₱ ₱, 17c
Solid Cast Steel..... " 32c
Striking Sledges..... ₱ ₱ extra, 7c

Snaths and Cradles......dis 25 %

Springs.—Cleveland Spring Co.'s—
Carriage and Express.....dis 5 %
Blue Seat Springs.....new list dis 10 %

Tacks.—Norway Tack Co.'s ½ weight.....dis 50 %
Brads..... dis 50 %

Thimble Skeins.—Pump & Skein Co.'s.....dis 20&5 %

Traps.—Newhouse Patent.....dis 15 %

Vises.—Solid Box..... ₱ ₱ 16c
Wilson Mfg. Co.'s.....dis 15 %

Wrenches.—Coes' Genuine.....dis 30 %
Coes' Pattern.....dis 40 %
Taft's.....dis 50 %

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.

Tin Plate.
IC, 10x14, Charcoal...$13 50 | IC, continuous, 20 in. x 200 ft.....
IX, 10x14, " .... 16 50 | IX, continuous, 20 in. x 200 ft.....
IC, 12x12, " .... 14 00 | IC, 10x14, best Coke..$12 50
IX, 12x12, " .... 17 00 | IC, 10x14, good " .. 12 50
IC 14x20, " .... 14 50 | IC, 10x20, " 20 00
IX, 14x20, " .... 17 50 | IX, 14x20, " 17 00
IC, 14x20, Terne.... 13 00 | IC, 20x28, " 26 00
IX, 14x20, " .... 16 00 | IC, 14x20, Coke Lead. 12 00
IC, 20x28, " .... 26 00 | IX 20x28, Terne..... 34 00

Block Tin.
Large Pigs.....38c | Bars..... 40c
Small " .....39c |

Sheet Zinc.
Casks.....₱ ₱ 10 c | Sheet.....₱ ₱ 11c

Solder.
No. 1, Refined, in bars or plate..... 27c
No. 2, " " " 25c
Pig Lead..... 8½c

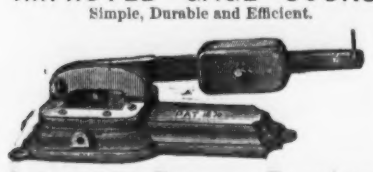
Sheet Copper.—18 to 100 lbs. Sheets 30x60..... 35c
14 to 16 lbs., Sheets 30x60..... 35c
10 to 12 lbs., " and 20x72..... 38c
6 to 9 lbs., " 41c
Tinned, 14 and 16 oz. 14x48..... 35c
Planished, 14 and 16 oz. 14x48..... 41c
" No. 7, 8 and 9..... 43c
Copper Bottoms..... 34c

Sheet Iron.— Com'n Sm'th. Char'l. Russia.
No. 16 to 20.....3½c 4c 5½c 10½ c
No. 22 to 24.....3½c 4c 8½c 10½ c
No. 26.....3c 6½c 8½c 10½ c
No. 27.....3½c 6½c 8½c 10½ c

Galvanized Iron..... dis 10 %
Iron Rivets..... dis 15 %
Iron Wire..... dis 30 %
Coppered Market Wire..... dis 25 %
Copper Rivets and Burs..... dis 10 %
Russia Iron.—Nos. 9, 10, 11 and 12, ₱ ₱..... 21c @ 22c
No. 1, stained, ₱ ₱..... 20c
Imitation Russia, ₱ ₱..... 14c

IMPROVED GAGE COCKS

Simple, Durable and Efficient.



Automatic Damper Regulator

FOR STEAM BOILERS.

SAFETY, ECONOMY & DURABILITY

MURRILL & KEIZER, Baltimore.

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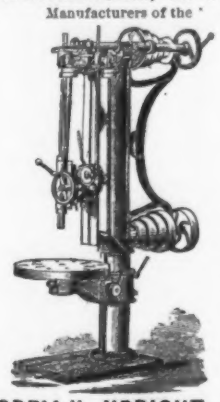
Manufacturers of the



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And other First-Class Machinists' Tools.

Machinery, &c.

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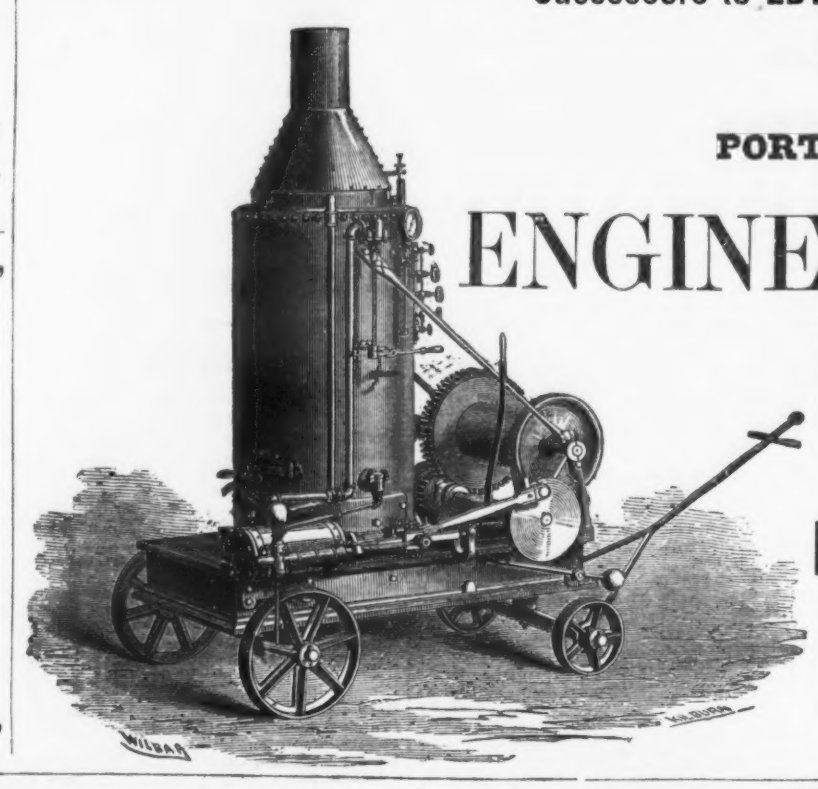
Successors to EDWARD P. HAMPSON,

38 Cortlandt Street, N. Y.



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PORTABLE HOISTING ENGINES, &c.

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Of excellent designs and workmanship, complete, with best modern attachments. Gun and Sewing Machine Machinery and Fixtures in great variety, Friction Clutch Pulleys,

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ROLLER TUBE EXPANDERS

And Direct-Acting Steam Hammers.

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The "EMPIRE," a Fan Blowing

PORTABLE FORGE,

(Patent Applied for.)

Without BELTS or BELLOWS.

It is more Easily Worked, gives a Better Blast, and is the Cheapest forge made, and

☞ It has no Back Draught.

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And 118 Chambers St., N. Y.

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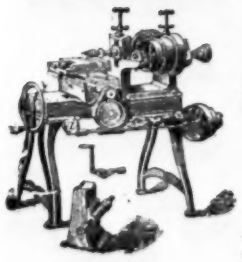

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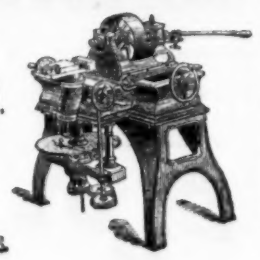
GEO. S. LINCOLN & CO.

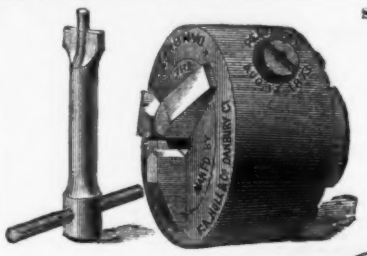
HARTFORD, CONN.

Machinists' Tools,

AND

LINCOLN'S FRICTION CLUTCH PULLEYS.





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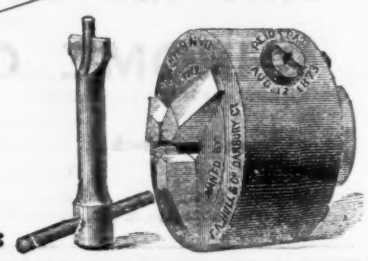
Not equalled in any essential. Only Chuck holding drills from ¼ down to 0. Runs *true* on all sizes, and will never slip or "get."

F. A. HULL & CO., Manufacturers, Danbury, Conn.



C. H. Reid's Patent, Aug. 12th, 1873

SELDEN PATENT

DIRECT ACTION STEAM PUMP,

Patented August 2nd and December 20th, 1870.

Tank Pump, with Boiler Feed Attachment.

For Boiler Feeders,
For Water Works,
For Fire Pumps,
For Mines, etc, etc.

And for all purposes for which Steam Pumps can be used. Sold under full guarantee. Money will be returned if, from any cause, they should prove unsatisfactory. Send for Circular and Price List, fully describing them, to

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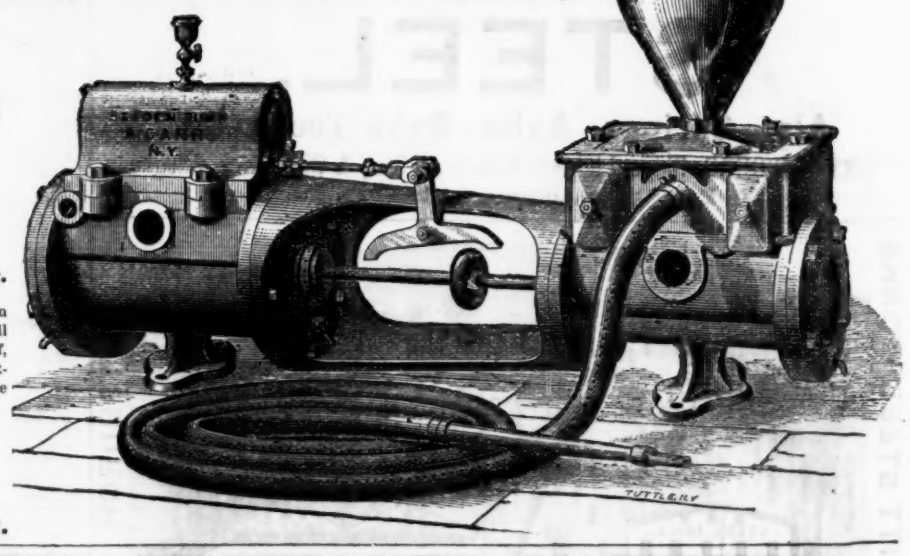
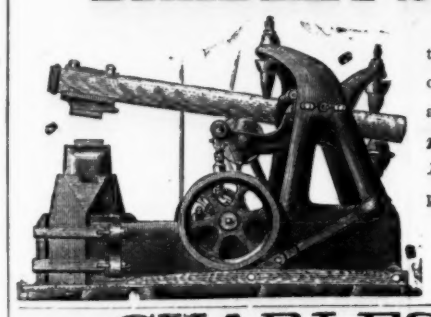


BRADLEY'S CUSHIONED HAMMER.



This Hammer has many valuable improvements made useful in the device for cushioning the blow, thereby relieving all the working parts from that jar and concussion which is the destroying element of other Helve Hammers. It is made Adjustable in Line of Action, Length of Stroke, Rapidity of Motion, and Weight of Blow, all of which are controlled at the will of the operator. They have *Larger Capacity, Cost Less,* are more *Durable,* take up *Less Room,* do *More* and *Better Work* at *Less Expense* for Power, than any other Hammer in use. We guarantee them fully as recommended. For particulars, address

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SYRACUSE NEW YORK.

CHARLES CHURCHILL & CO.,

American Merchants & Importers of Machinery & Tools,

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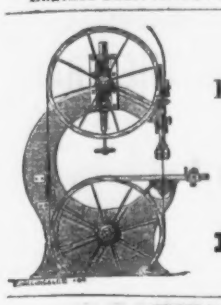

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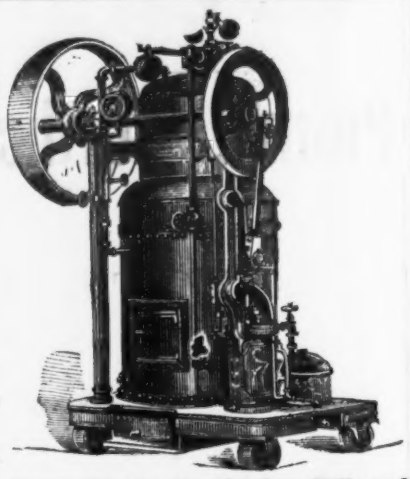

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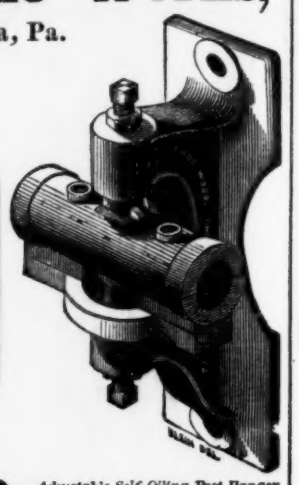

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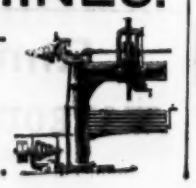

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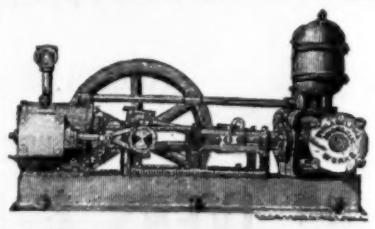

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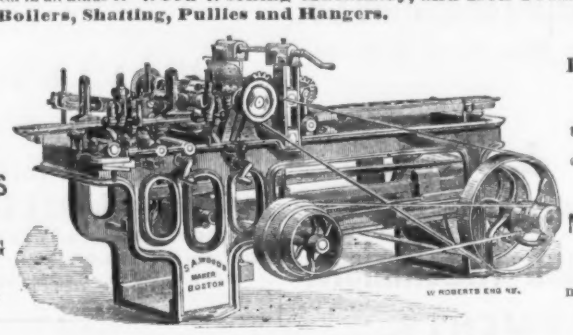

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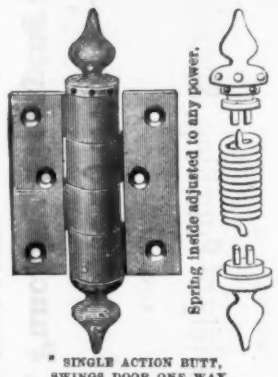

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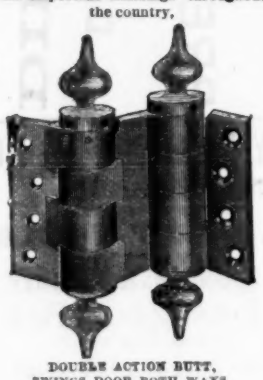

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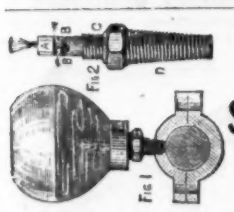

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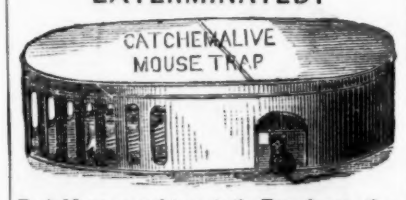

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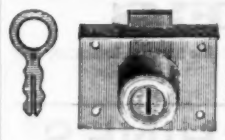

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